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A Case Study of Three Korean Elementary School Students' English Reading Experiences Assisted by Hyperlinked Online Resources

한국 초등학생들의 온라인 하이퍼링크 자료를 활용한 영어 읽기 경험 사례 연구

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서울대학교 대학원

외국어교육과 영어전공

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A Case Study of Three Korean Elementary School Students' English Reading Experiences Assisted by Hyperlinked Online Resources

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ABSTRACT

A Case Study of Three Korean Elementary School Students' English Reading Experiences Assisted by Hyperlinked Online Resources

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Digital literacy plays an important role in the recent computer-assisted learning environment. The 2015 Revised National English Curriculum introduced digital literacy as a core ability to develop in English language learners. In accordance with the emergence of digital literacy, various online reading materials embedded with hypertexts were provided to EFL learners, which connected the English reading text with diverse online resources existing outside of the text. As readers' effective use of online resources in English reading is the core ability of digital literacy, the importance of hypertexts and hyperlinked resources in English reading was examined by many researchers. However, few studies are conducted on young readers' use of hyperlinked online resources in English reading. Therefore, this study aims to investigate the use of Korean elementary school students' hyperlinked online resources in English reading and their perception of

the use of hyperlinked online resources. Exploring readers' use and perception of English reading assisted by hyperlinked online information sources, will provide insights into English reading instruction by determining young readers' difficulties in reading English and how they solve the difficulties with the effective use of hypertext materials while reading.

For this study, three 6th grade Korean elementary school students voluntarily participated in the sixteen sessions. Throughout the sixteen sessions, students read English science expository texts. Students used three online resources (Naver English Dictionary (NED), Naver Encyclopedia (NE), and YouTube) to assist their reading. Following the reading tasks, semi-structured interviews were conducted to explore the students' perception of using hyperlinked resources while reading. The use of hyperlinked online resources in English reading was screen-recorded with Zoom software and the following semi-structured interviews were recorded with an iPhone audio-recording program.

The findings suggested that readers mainly used hyperlinked online resources to support them in addressing lexical difficulties in reading, which in turn resulted in a positive evaluation of the use of online resources in their English reading. By complementing their linguistic deficiencies with the hyperlinked online resources, readers could feel self-confidence and self-efficacy in English reading. The accumulation of experiences in English reading assisted by

hyperlinked online resources also elicited reading interest among readers, which proposed an optimistic view of turning readers into life-long readers.

Throughout the sixteen sessions, readers also developed online reading strategies such as locating the appropriate information they needed or finding an effective way to use hyperlinked resources. Although the degree of the potential of hyperlinked online resources differed among individual learners due to their differences in language proficiency or prior knowledge, the use of online resources in reading resulted in their overall cognitive and affective change in English reading.

Although this study had some limitations concerning the methodological approach of the research, it will contribute to a better understanding of Korean elementary school students' English reading behavior with the potential benefits of hyperlinked online resources in English learning.

Key Words: hypertext, hypertext reading, hyperlinked online resources, digital literacy, online reading strategy, English reading instruction

Student Number: 2020-24698

TABLE OF CONTENTS

ABSTRACT ····· **i**

TABLE OF CONTENTS ····· **iv**

LIST OF TABLES ····· **vii**

LIST OF FIGURES ····· **ix**

CHAPTER 1. INTRODUCTION ····· **1**

1.1 The Background of the Study ····· 1

1.2 The Purpose of the Study ····· 6

1.3 The Organization of the Thesis ····· 7

CHAPTER 2. LITERATURE REVIEW ····· **8**

2.1 Hypertext in Online Reading ····· 8

2.1.1 The Features of Hypertext in Online Reading ····· 8

2.2 Online Reading Strategies ····· 11

2.3 Factors Influencing Hypertext Reading ····· 15

2.3.1 External Factors in Hypertext Reading ····· 15

2.3.2 Internal Factors in Hypertext Reading ····· 19

2.4 Limitations of Previous Research ····· 24

CHAPTER 3. METHODOLOGY ····· 27

3.1 Participants ····· 28

3.2 Instruments ····· 33

3.2.1 Background Information Questions ····· 33

3.2.2 Hypertexts ····· 34

3.2.3 Comprehension Questions ····· 45

3.2.4 Semi-structured Interview Questions ····· 45

3.2.5 Final Interview Questions ····· 46

3.3 Data Collection ····· 47

3.3.1 Think aloud Protocol ····· 49

3.4 Data Transcription ····· 51

3.5 Data Analysis ····· 53

3.5.1 Analysis of Reading Process ····· 53

3.5.2 Analysis of Interviews ····· 56

CHAPTER 4. RESULTS AND DISCUSSION ····· 59

4.1 Comparison of the Three Readers' Use of Hyperlinked Online Resources in English Reading ····· 60

4.1.1 Readers' Use of Pre-Determined Hyperlinked Online Resources in English Reading ····· 62

4.1.2 Readers' Voluntary Use of Hyperlinked Online Resources in English Reading ····· 74

4.1.3 Readers' Perceptions of Hyperlinked Online Resource Use in English Reading ····· 94
4.2 The Potentials of English Reading Assisted by Hyperlinked Online Resources ····· 102
4.2.1 The Positive Influence of Hyperlinked Online Resources on EFL Readers' Cognitive and Affective Domain ····· 102
4.2.2 The Value of Reading Experience and Practice ····· 105

CHAPTER 5. CONCLUSION ····· 108
5.1 Major Findings and Implications ····· 108
5.2 Limitations and Suggestions for Further Research ····· 111

REFERENCES ····· 114
APPENDICES ····· 123
ABSTRACT IN KOREAN ····· 133

LIST OF TABLES

Table 3.1 The Amounts of Time Spent on Online Reading Tasks by Individual Participants ····· 44

Table 3.2 The Protocol to Transcribe the Online Reading Process ····· 51

Table 3.3 Example of the Transcription of Online Reading Process Transcript ····· 52

Table 3.4 The Coding Scheme for the Online Reading Process Transcript ····· 54

Table 3.5 The Coding Scheme for Interview Transcript ····· 57

Table 4.1 Total Numbers of Pre-determined Hyperlinked Online Resources in Each Session ····· 61

Table 4.2 Reader's Use of the Pre-determined Hyperlinked Online Resources in the Three Phases ····· 63

Table 4.3 Example of Junseo's Use of Pre-Determined Hyperlinked Online Resource in Session 5 ····· 66

Table 4.4 Example of Jiwon's Use of Pre-Determined Hyperlinked Online Resource in Session 13 ····· 68

Table 4.5 Example of Junseo's Use of Pre-Determined Hyperlinked Online Resource in Session 14 ····· 71

Table 4.6 Frequency of Voluntary Use of the Hyperlinked Online Resources in the Three Phases ····· 75

Table 4.7 Example of Jiwon's Voluntary Use of Hyperlinked Online Resource in Session 4 ·· 77

Table 4.8 Example of Juyeon's Voluntary Use of Hyperlinked Online Resource in Session 7 · 80

Table 4.9 The Purpose of Jiwon's Voluntary Use of Online Dictionary ····· 83

Table 4.10 Example of Jiwon's Voluntary Use of Hyperlinked Online Resource in Session 1 84

Table 4.11 The Purpose of Juyeon's Voluntary Use of Online Dictionary ····· 86
Table 4.12 Example of Juyeon's Voluntary Use of Hyperlinked Online Resource in Session 1 ····· 87
Table 4.13 Example of Juyeon's Voluntary Use of Hyperlinked Online Resource in Session 13 ····· 88
Table 4.14 Example of Junseo's Voluntary Use of Hyperlinked Online Resource in Session 14 ····· 90
Table 4.15 The Purpose of Junseo's Voluntary Use of Online Dictionary····· 92

LIST OF FIGURES

Figure 2.1 A Process Model for Hypertext Reading ····· 9

Figure 2.2 Types of Text Structure in Hypertext System ····· 16

Figure 3.1 The Display of Hypertext Used in Session 10 ····· 35

Figure 3.2 The Display of Naver English Dictionary Hyperlinked with English Text (Session 10) ····· 39

Figure 3.3 The Display of YouTube Hyperlinked with English Text (Session 10)····· 39

Figure 3.4 The Display of Naver Encyclopedia Hyperlinked with English Text (Session 10) 40

Figure 3.5 The Features of Naver English Dictionary····· 41

Figure 3.6 The Features of Naver Encyclopedia ····· 42

Figure 3.7 The Features of YouTube ····· 43

Figure 4.1 The Graph of Readers' Use of Pre-determined Hyperlinked Online Resources in the 16 English Reading Sessions····· 62

Figure 4.2 The Graph of Readers' Voluntary Use of Hyperlinked Online Resources in the 16 English Reading Sessions····· 74

CHAPTER 1.

INTRODUCTION

This study aims to explore Korean elementary school students' use of hypertext materials and their perceptions toward the use of hypertext materials in online English reading. This chapter outlines the purpose and organization of the thesis. Section 1.1 introduces the background and purpose of the study, followed by research questions in Section 1.2. Section 1.3 presents the organization of the thesis.

1.1 The Background of the Study

The influence of computer technology in English education has changed the pedagogy and research perspectives of reading. Technological advances have enabled students to read in any place or at any time they want without carrying heavy textbooks or dictionaries to assist their reading in English. These changes have emphasized a new form of literacy called "information literacy" or "web literacy." Information literacy goes beyond the traditional meaning of literacy (Lankshear & Knobel, 2003), which is reading,

writing, and arithmetic to involve the strategies of searching and locating information; evaluating the reliability of information; and constructing information in a more individually meaningful form. This new form of literacy has been added to the Korean 2015 Revised National English Curriculum (RNEC), which emphasizes the need to develop information literacy among young learners. Information-literate learners are able to utilize online resources effectively for different purposes. They can read the information and select the most appropriate tools among diverse media to solve their problems to understand the information online (Zhang & Duke, 2008). Another reason why information literacy has gained importance can be derived from the emergence of pandemics. As COVID-19 emerged, learners had to take English classes at home instead of going to school. Teachers provided students with additional reading materials online without face-to-face instruction. Reading online at home has urged students to search and locate information effectively to solve reading problems they might have had studying online.

As the present reading environment has been extended to online, English readers have grown accustomed to utilizing different sources on the Internet than before. What makes readers able to reach diverse materials is termed “hypertext” or “hyperlinked materials.” Hypertext is a distinctive tool in an online reading environment, which provides readers with a path to reach diverse resources. Hypertext is, therefore, a various type of textual, visual, or

audial information resource, which is linked within the text or outside the text so that readers can move non-linearly by clicking the link (Unz & Hesse, 1999). “Hypertext” or “hypertext materials” are linked with online sources such as online dictionaries, online encyclopedias, and search engines, which facilitate students to learn useful language information (Coiro, 2011).

The potential of hypertext in reading has been investigated by previous studies (Cho, 2014; Lawless & Kulikowich, 1996; Potelle & Rouet, 2003; Procailo, 2017; Protopsaltis & Bouki, 2005; Yang, 2019). In prior studies, researchers have examined the effect of hypertext in terms of linguistic knowledge and reading comprehension skills (Chen, 2015; Cho, 2014; Coiro & Dobler, 2007; Yang, 2019). The results from previous studies indicate that hypertext can foster second language reading for learners in that it motivates students to read voluntarily and provides a chance to choose what they want to read. However, previous studies have focused more on how much hypertext affects learners, not how individual learners use the hypertext. As hypertext reading is different from printed reading due to their interactive characteristics while reading, being literate in hypertext includes readers’ knowledge of hypertext structure and readers’ different purposes for the use of hypertext (Unz & Hesse, 1999). Therefore, it is necessary to explore individual EFL readers’ online reading process qualitatively from various perspectives, as English reading is affected by readers’ numerous external and internal factors.

External factors are described as system-based features such as layouts, graphics, images, content titles, and font sizes. Internal factors can be categorized as cognitive variables such as prior knowledge, topic interest, topic familiarity, or English proficiency; affective variables can be defined as motivation to read and self-confidence.

Based on individual differences, readers showed different reading strategies or navigation patterns. Navigation in hypertext is related to all choices readers make during online reading such as selecting the online resources to supplement their reading and deciding whether to use the resources. It shows readers' autonomy in reading based on their needs. Although some researchers have explored the use of hypertext qualitatively, the investigation of hypertext materials was examined on pre-determined nodes with bounded computer systems such as CD-ROMs, or software programs made by the instructor. In this digital era, however, readers' decision to choose what they want to search and read is important. This exhorts the need to examine readers' behavior in a relatively open environment where readers are allowed to behave on their purpose.

However, very few hypertext studies have been conducted on young learners' use of hypertext materials while reading online. Most studies have been confined to observing the use of hypertext materials by adult readers or

readers with high English proficiency in online reading. Young readers are different from adult learners regarding their early exposure to the Internet environment and the amount of time spent on the Internet. According to the survey conducted by Korea Press Foundation (2022), about 98 percent of Korean elementary school students use the Internet more than once a week. They use the Internet for an average of 346 minutes a day, whereas adult readers are reported to use the Internet for an average of 177 minutes a day. As young learners are exposed to online environments at an early age and spent more time on the Internet compared to adult learners, they are expected to show different navigation strategies, which have yet to be explored in previous studies. In addition, as young learners are in a stage of cognitive and affective development (Coiro & Dobler, 2007; Shin et al., 1994), they are likely to develop their linguistic skills and reading strategies with the aid of carefully designed hypertext embedded with online resources.

Hence, this study aims to explore the use of Korean EFL elementary school students' English reading assisted by hyperlinked online resources. It also aims to investigate how students perceive the use of hyperlinked online resources while reading English text to reveal how individual young learners think and behave in hypertext reading.

1.2 The Purpose of the Study

The present study investigates Korean elementary school students' online English reading assisted by hypertext materials in diverse perspectives regarding individual learning backgrounds and cognitive and affective factors. It aims to examine the strategies students use during the process of online English reading assisted by hypertext and how they interact with hypertext materials while reading. It also attempts to explore how Korean elementary school students perceive the use of hypertext materials in online English reading. It also aims to examine the reading behaviors and strategies students use during the process of online English reading assisted by hypertext and how they develop cognitive and affective dimensions of learning in an online English reading environment assisted by hypertext materials.

The two research questions are as follows:

1. How do Korean elementary school students use hyperlinked online resources in English reading?
2. How do Korean elementary school students perceive the use of hyperlinked online resources in English reading?

1.3 The Organization of the Thesis

This thesis is constructed of eight chapters. Following the introduction chapter, Chapter 2 presents the review of the literature on hypertext material, online reading strategy, and the reader's individual differences that helped to form this thesis's research questions. Following Chapter 2, Chapter 3 presents the research methodology, which includes the study's materials, tasks, and procedures. This study used a qualitative measure to analyze the collected data of each participant's case, and key findings are illustrated in Chapter 4. Chapter 4 illustrates the three participant's use of hypertext materials and their perceptions of using the materials in online English reading. Chapter 4 additionally addresses emerging issues to consider, derived from this study. Chapter 5 draws a conclusion from the major findings of the study and suggests pedagogical implications.

CHAPTER 2.

LITERATURE REVIEW

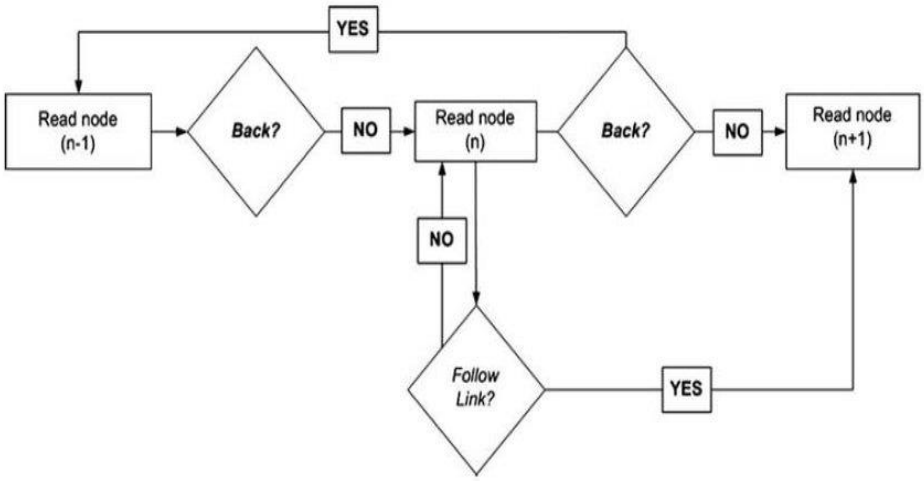
2.1 Hypertext in Online Reading

2.1.1 The Features of Hypertext in Online Reading

Online reading is a web-based reading that is usually embedded with hypertext. It enables learners to decide what they want to read, adjust reading order, and search for the information they need while reading. “Hypertext” or “hypertext material" is a computer-based system that is constructed with nodes and links. As seen in Figure 2.1, each node is connected by direct links. A hypertext system provides a mechanism for moving along the links. A broad definition for hypertext indicates a kind of informational environment in which diverse forms of materials and ideas are linked to one another in multiple ways (Burbules & Callister, 2000). It is a text with digital information that is linked with an electronic system such as dictionaries, encyclopedias, or databases such as graphics, pictures, videos, or text with the link structure (Coiro, 2011). The hypertext materials in general are indicated as informational sources with link structure, which readers can activate with a click of a mouse while reading

online.

Figure 2.1 A Process Model for Hypertext Reading (DeStefano & LeFevre, 2007)



Links embedded in the hypertext structure are formed to enable readers to select a target location of the information to move through the text rather than just turn the page up and down (Rouet & Levonen, 1996). The link is often presented as visual or textual representations, such as multiple icons or buttons to guide the reader to the information, or the content title, which indicates the information sources. When the readers click the link, it navigates readers directly to the linked online dictionary or encyclopedia that is used widely in online reading to aid the students' understanding of unknown words or concepts. Therefore, hypertext enhances readers' autonomy by providing them with a chance to choose and click the linked resources (Akbulut, 2008; Ariew

& Ercetin, 2004; Cho, 2014; Lawless & Kulikowich, 1996; Lomicka, 1998; Zammit, 2011). It is not activated unless readers choose to click the word.

The potential of reading text assisted by hyperlinked online resources has attracted several researchers in that they examined the reading process of the reader to figure out the implication it has on English reading (Jose, 2021; Lawless et al., 2002; Protopsaltis & Bouki, 2005; Salmeron & Garcia, 2011; Wu et al., 2020; Yang, 2019).

According to previous research, regarding the use of hyperlinked resources, readers developed reading comprehension skills along with critical literacy (Abdi, 2013; Zhang & Duke, 2008) because they had many options to choose from while reading. Readers had to evaluate the information or information cues they encountered to accomplish their reading goals, which, in turn, established critical thinking ability and inference skills. However, due to these several pathways to choose from hypertext reading, some researchers claimed that using hypertext materials imposed cognitive demands on readers, which might cause disorientation during reading (Sweller et al., 2011; Yeung, 1999). Therefore, the decision of whether or not to follow the link might cause a cognitive burden on the reader, which interrupts the individual reader's reading process online.

Though there exist some possible weaknesses in hypertext reading,

hyperlinked resources are still considered to be helpful online tools to various readers and need to be explored further in relation to individual readers.

2.2 Online Reading Strategies

Strategies are the intentional and conscious practices or skills that make readers reach successful comprehension (Pressely & Harris, 2009). Online reading strategies, to some extent, are similar to printed text reading strategies such as scanning, skimming, evaluating, predicting, and rereading strategies (Schmar-Dobler, 2003; Zhang & Duke, 2008). However, there are some distinctive features of online reading compared to reading with printed text.

One unique strategy presented in online reading is “navigation patterns” or “navigation strategies” (Unz & Hesse, 1999). When people communicate face to face, there are conversational exchanges of two or more interlocutors in the communication. They react to each other’s verbal or non-verbal remarks. However, in the online environment, the meaning-making process is mediated by technology, which reacts to the commands provided by the mouse or keyboard linked with the hypertext materials a student activated (Zammit, 2011). Navigation refers to every choice and move readers make online through clicking, scrolling, or typing. Navigation strategy is related to the strategic acts of individual users, demonstrated as link selection or overview processing strategies (Salmeron & Garcia, 2011). Successful navigation can

contribute to better use of hypertext materials (Min, 2017; Salmeron & Garcia, 2011; Yang, 2019; Zhang & Duke, 2008).

Online reading assisted by different hypertext is likely to endow the reader more autonomy than printed text (Cho, 2014; Lawless & Kulikowich, 1996; Lomicka, 1998). Many previous researchers have tried to identify online reading strategies but there was no general categorization of these various strategies. Therefore, Anderson (2003) tried to determine online reading strategies used by non-native English learners and categorized them into three main strategies: global strategies, problem-solving strategies, and support strategies. He adapted the Survey of Reading Strategies (SORS) (Mohktari & Shoery, 2002) and modified it into the Online Survey of Reading Strategies (OSORS), which contained 38 items categorized into global strategies, problem-solving strategies, and support strategies. However, it was difficult to categorize some strategies into each division of strategy, which undertook reclassification of each category of online strategies by researchers (Poole, 2008; Taki, 2016). Therefore, global strategies referred to readers' general use of online text such as scanning, skimming, re-reading, predicting and guessing, monitoring and evaluating the text, and noticing the graphic organizer or input enhancers such as bold type or colored font. Problem-solving strategies included readers' use of their own strategy to solve problems they encountered

such as visualization or picture information to remember well, paying close attention to the difficult part of reading, and adjusting the reading speed to understand the text. Supportive strategy included some use of external sources or materials to support readers' reading comprehension. For example, readers can use dictionaries or encyclopedias to help them understand the online text. They can also take notes online to help them understand a difficult text. Chatting with other online users through messenger to solve problems was also categorized as a supportive strategy. Likewise, supportive strategies usually included readers' use of supplementary sources to comprehend the texts in the modified OSORS.

Each strategy from the modified OSORS can be illustrated in detail in terms of the actual use of online resources. First, in the global strategy, deciding which link to visit or assigning an order of online resources can be referred to as a navigation strategy. Second is a monitoring strategy through which readers constantly monitor their comprehension process whether the text is understandable without the supportive materials. Monitoring also involved evaluating the accessed information, trying not to get lost in the searching process, constructing the reader's own mental model of obtained information, and noticing the gap between information and one's own prior knowledge (Jose, 2021; Lawless & Kulikowich, 1996; Protopsaltis & Bouki, 2005; Unz & Hesse,

1999; Yang, 2019). Effective use of the navigation and monitoring strategies could help readers achieve their reading goals in a dynamic online reading environment in that readers are consciously aware of what they are reading and where to locate the information they need. It could be explained as a self-regulatory strategy in the reading process (Shin et al., 1994; Wu et al., 2020).

Readers are likely to be influenced by more diverse variables in the online reading environment than in the printed reading environment. For example, previous studies have claimed that students with higher reading comprehension abilities utilize better navigation strategies (Salmeron & Garcia, 2011). However, there is still no clear justification for how readers deal with diverse variables while reading online. Based on the participants' reflections, this study will explore the perception and behavior of the individual reader while they read online, embedded by various hypertext materials. It has been shown that when readers are dealing with the texts, their personal or social backgrounds interact with the texts in diverse ways (Coiro & Dobler, 2007; Lawless & Kulikowich, 1996; Zhang & Duke, 2008). To extensively explore reading strategies and underlying thoughts of students, it is important to find out the factors that could influence the readers' online reading process. Therefore, the next section will address reader external and reader internal factors that influence reading strategies.

2.3 Factors Influencing Hypertext Reading

In the hypertext reading process, not only readers' personal backgrounds but also computer technology existing outside of the reader are shown to affect readers' comprehension. Therefore, the following section, 2.3.1, presents various external factors influencing a reader's hypertext reading, along with internal factors in section 2.3.2.

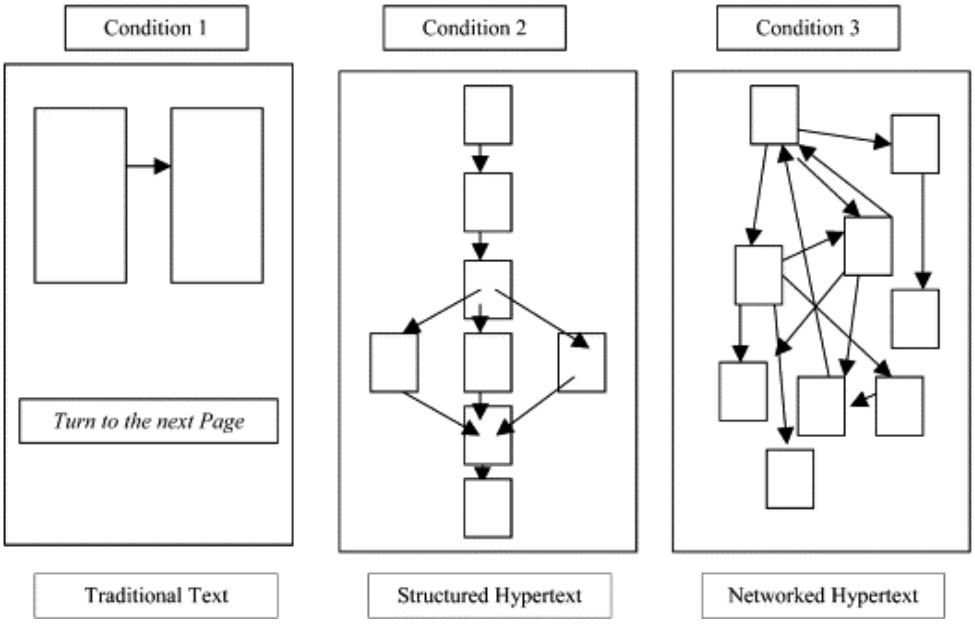
2.3.1 External Factors in Hypertext Reading

Reader external factors are certain features that exist outside the reader such as the presentation of tools, layout of texts and maps, and text types. These external factors are considered independent variables that affect the readers' strategy use (Balcytiene, 1999; Lee et al., 2006; Unz & Hesse, 1999).

In hypertext-embedded online reading, students are influenced by the structure of the hypertext materials. As seen in Figure 2.2, the hypertext structures can be categorized into a linear structure (e.g., alphabetical structure, traditional text structure), hierarchical structure, and network structure. The linear structure is a sequential structure in that each node is linked to a fixed order. Movement is obtained by the "next" or "previous" button, which is the simplest version similar to the traditional text structure. The hierarchical

structure is organized in a strict hierarchical order in that one title contains several subtitles related to it. The network structure is considered the typical non-linear version of text structure, similar to web-based online resources. It provides one piece of information to be linked to various types of information without being assigned the order of the text (Lee & Tedder, 2003; McDonald & Stevenson, 1996).

Figure 2.2 Types of Text Structure in the Hypertext System (Lee & Tedder, 2003)



The network structure is sometimes interchangeably termed “ill-structured hypertext” in some hypertext research (Park & Yang, 2003; Spiro &

Jehng, 1990). Ill-structured hypertext does not have explicit guidance (e.g., navigation overview) to lead users to choose specific hypertext when the link is not provided in hierarchical order or when the access to hypertext needs to be interpreted in situational cues rather than the explicit pathway to the text (Spiro & Jehng, 1990). As the ill-structured hypertext is linked to various pathways, readers must choose the order of navigation pathways, which requires more autonomy in readers.

These hypertext structures seemed to influence students' reading performance. For example, students with low language proficiency were likely to show anxiety or lack of interest while reading, which resulted in re-reading or skipping and failing to accomplish reading comprehension in network structure hypertext materials. Conversely, students with high language proficiency benefitted from the network structure hypertext materials, which contributed to the active use of learning strategies and a deeper understanding of the text (Shapiro & Niederhauser, 2004). However, the results are still inconclusive. Potelle and Rouet (2003) indicated that there was no significant difference in high-level readers' comprehension between the linear or hierarchical order of hypertext structure, which exhorts the need to take various internal factors into account in examining the reader's use of hypertext materials. Moreover, numerous research was conducted with bounded information sources such as CD-ROMs or particular software programs

(Lawless & Kulikowich, 1996; Potelle & Rouet, 2003; Procailo, 2017; Protopsaltis & Bouki, 2005; Zammit, 2011), which had limited nodes and links to choose from. Hence, it accentuates the need to conduct studies in web-based hypertext resources such as Internet search engines, online dictionaries, online encyclopedias, and YouTube, which enable readers to select and search for boundless, open-ended information, depending on their needs and intention.

Other reader external factors are access tools. There are tools with different modes of presentation such as glossaries, maps, graphic organizers, and graphs. Several studies have claimed that English readers' linguistic proficiency such as reading comprehension and vocabulary knowledge has been achieved by using these tools effectively (AbuSeileek, 2008, 2011; Akbulut, 2008; Ariew & Ercetin, 2004; Ramezanali et al., 2021; Yun, 2011). Such comprehension can be explained by the dual-coding theory in that students tended to develop retrieval cues for the word in the memory by constructing the close connection between the word in a native language and its corresponding image, graphs, or video in the foreign language (Paivio, 1990; Plass et al., 1998).

Another reader external variable such as the location of tools has been shown to affect reader comprehension in some studies **(**AbuSeileek, 2008, 2011; Akbulut, 2008). However, it is still inconclusive that the location of the

access tools did not significantly affect the comprehension score in some research (Chen & Yen, 2013; Varol & Ercetin, 2021).

Therefore, external factors are not the only variables that affect the learners' reading process. They come into play with internal variables, which lead to different use of strategies or effects of learning. Many researchers have tried to explore how user-internal factors interact with external factors (Lee et al., 2006). Thus, the next section demonstrates internal factors influencing hypertext reading.

2.3.2 Internal Factors in Hypertext Reading

Both internal and external features interact with readers during online hypertext reading. Internal factors can be described as certain features embedded within the readers themselves. Many researchers have explored the interaction of reader internal factors and reading comprehension (Hashemi & Bagheri, 2014; Holopainen et al., 2020; Lau & Chan, 2003).

Internal factors commonly include cognitive and affective factors (Lawless et al., 2002; Procailo, 2017; Unz & Hesse, 1999). Cognitive factors can be demonstrated as prior knowledge, language proficiency, learners' experience with computer technology, learning style, and working memory (Brinkerhoff et al., 2001; Lawless & Kulikowich, 1996; Meza-Fernandez &

Sepalveda-Sarieg, 2017; Walkowiak et al., 2015). Affective factors include learners' situational interest, personal interest, anxiety, and motivation to learn. Different internal factors of learners result in different navigation strategies. Among several prior studies, Lawless and Kulikowich (1996) analyzed learners' learning styles of hypertext materials with cluster analysis in relation to diverse internal factors. They categorized undergraduate students into three groups based on their cognitive factors (e.g., domain knowledge) and affective factors (e.g., situational interest, individual interest): (1) knowledge seekers, (2) feature explorers, and (3) apathetic hypertext users. Knowledge seekers focused on reading content-related hypertext materials, whereas feature explorers focused on the systematic view of materials such as modes of materials and interesting titles of the text. Apathetic users were not interested in content-related materials and thus spent little time reading the text. Apathetic users also read the materials randomly, which made it difficult to predict their upcoming behavior. This study provided the basis for further research to consider diverse cognitive and affective factors of readers in their computer based hypertext reading.

Among many other internal variables of readers, the level of experience related to computers (Brinkerhoff et al., 2001; Walkowiak et al., 2015), and working memory are gaining importance with the continuous development of computer technology in hypertext reading (Burin et al., 2015; DeStefano &

LeFevre, 2007; Plass et al., 2003; Procailo, 2017). Learners with higher exposure to computer programs tended to comprehend hypertext-embedded materials better. For example, learners with higher computer experience showed fewer errors in solving tasks and found an easier path to search for information (Walkowiak et al., 2015). It is also suggested that readers' familiarity with the modes of presentation such as videos or glossary type of hyperlinked resources on the computer screen can affect task performance. Learners tended to feel more comfortable and confident in a familiar online program than when faced with new modes of the computer program (Brinkerhoff et al., 2001). Working memory plays an important role in readers' understanding of hypertext materials. As individual working memory has a limited capacity, it allows readers to perform a limited number of tasks simultaneously. For example, when readers choose a link and read the contents they have selected in the hypertext materials, they are activating their working memory and such actions impose cognitive load or cognitive burden on their cognitive system (DeStefano & LeFevre, 2007; Ignacio et al., 2009; Sweller, 1988). Cognitive load, in turn, might lead readers to lose their way while reading. Students with high working memory were likely to be less disoriented and showed better recall of hypertext materials (Lee & Tedder, 2003; Procailo, 2017).

Other cognitive factors such as prior knowledge and linguistic proficiency are shown to be influential to readers while reading hypertext materials. Readers' prior knowledge includes knowledge of the text type, structure, or genre, knowledge of the subject, content, or topic, cultural knowledge, and world knowledge (Alderson, 2000). In terms of prior content knowledge in hypertext comprehension studies, students with high prior content knowledge tended to infer meaning well regardless of the structure of hypertext materials, but students with low prior content knowledge were likely to reach a global level of inference only with the aid of a hierarchical map or navigation overview that led them to choose coherent hypertext materials (Potelle & Rouet, 2003; Salmeron et al., 2006).

Lastly, the interest of the individual reader is one of the most important independent variables in that readers choose interesting texts or links when reading hypertext materials (Lomicka, 1998; Park & Kim, 2013; Protopsaltis & Bouki, 2005; Yang, 2019). Interest factor includes situational interest and individual interest. For example, situational interest is a type of interest that can be derived from the features of the screen or events that happened in the text, which is mostly transitory. Individual interest is considered permanent, occurring by the reader's particular favor for some domain or events. This individual interest is generally maintained during the entire session (Hidi, 1990, 2001; Joh, 2004; Lawless et al., 2002). The interest factor can affect the reading

order or reading comprehension of readers in hypertext reading. In previous research conducted on Canadian high school students, students were provided with four content titles hyperlinked with each expository text and were required to select the order of reading. They selected the content title based on their topic of interest and postponed choosing the less interesting topic. After reading each text, students were provided with multiple-choice items asking about the materials they read. The results showed that students scored higher in the interesting topic they chose at the beginning, which was explained by their active engagement in reading the interesting topics than the less interesting topics. (Ainley et al., 2002).

In general, many internal factors come into play with diverse internal and external factors of readers. There is neither one independent variable to affect reading nor the determined strategy of the reader in the hypertext reading process (Lee & Tedder, 2003; McNamara, 2001; Salmeron et al., 2017; Shin et al., 1994; Slemmer, 2002). Therefore, it is necessary to extensively explore individual readers' online reading behavior in order to draw a broader understanding of young readers who are in the phase of cognitive development.

2.4 Limitations of Previous Research

As hypertext materials are widely used in English classrooms to support English learners, very little research is conducted on elementary school learners in the field of English reading assisted by hyperlinked online resources. Most prior studies focused on college students or secondary school learners. Young learners are different from adults because they are in the stage of cognitive and affective development. They were shown to have less self-regulatory skills or learner control than adults. Hence, they were more easily distracted from online reading than adult learners, which made it challenging to conduct research on young readers (Bilal, 2002; Braasch, 2020; Cho, 2014; Fidel et al., 1999; Shin et al., 1994). Therefore, with its careful design to support young readers' online English reading, this study aims to examine young readers' use of hypertext materials in their online English reading process. By investigating the use and perception of hyperlinked online resources in young readers' online English reading, this study aims to unveil the potential benefits of hypertext on the cognitive and affective development of readers.

In addition, with continuous technology development, students are likely to be acquainted with using web-based online resources such as various search engines, online dictionaries, or YouTube from an early age. However,

numerous research confined the hypertext to limited nodes bounded by CD-ROMs or online software programs (Lawless & Kulikowich, 1996; Potelle & Rouet, 2003; Procailo, 2017; Protopsaltis & Bouki, 2005; Zammit, 2011). Therefore, it is necessary to extend hypertext research to account for boundless web-based materials through which students can autonomously use the hyperlinked resources based on their needs and intentions. The extension of hypertext to the open-ended web might provide readers with numerous choices to make, which would result in different online reading strategies.

Literacy is rapidly changing as new technologies for information and communication emerge (Leu, 2000). Understanding readers' interaction with this new technology in reading and how they utilize this technology to support their reading would provide insight into comprehension instruction since the identification of new strategies would develop wider strategy categorization for teachers. It would also encompass recent and relevant online reading strategies. Therefore, this aims to extend the range of readers into elementary school students, who tend to be exposed to online resources at an early age, and explore elementary school learners' use of hyperlinked online resources and how they perceive the resources throughout the whole reading process. The following chapter presents this study's methodological design to examine the two research questions on elementary school students' use of hyperlinked online resources and their perception of using hyperlinked online resources in

English reading.

CHAPTER 3.

METHODOLOGY

This chapter clarifies the study's methodological approach and research design. This study adopted a qualitative method approach to address the research questions. The first section presents background information about the participants. Section 3.2 discusses the instruments that were utilized in this study: background information interview questions, hypertexts, comprehension questions, and semi-structured interview questions, and final. Section 3.3 introduces the whole progression of data collection and the think-aloud protocol which participants used during the study. The following two sections contain a data transcription of collected data and analysis.

3.1 Participants

This research was conducted on three Korean 6th grade students in elementary school. Two female students and one male student took part in this study. The three students attended the same elementary school located in Gyeonggi Province, South Korea. Their first language is Korean.

The participants' English proficiency skills were evaluated by the English Achievement Test, which is developed by the Korea Institute of Curriculum and Evaluation (KICE). The test included a total of 34 questions (17 listening comprehension items, 13 reading comprehension items, and 4 writing items). The test was conducted before the online reading task sessions to sort out highly proficient participants who did not require the help of hypertext materials while reading the online text, or low proficient participants who had difficulty reading the alphabet or words. Students who answered more than 90 percent of the questions correct (more than 30 questions out of 34 questions), or students who answered fewer than 40 percent of the questions correct (less than 12 questions out of 34 questions) were screened before the online reading task sessions to conduct the reading task effectively. Initially, five participants voluntarily applied for this study; however, two were screened before the study because they answered fewer than 12 questions correctly. Therefore, only three participants' data were collected in this study. After the

test, a background information interview with a total of 24 questions was conducted to collect students' English learning background, reading experience, and interest in learning English. A summary of the participants' English learning background information is shown as follows.

Jiwon started to learn English when she was seven years old. She has never been to an English-speaking country. At the time of participation, she mentioned that her daily exposure to English on weekdays was one to two hours. She did not go to hak-won and studied at home instead with the online English reading program. She enjoyed reading so much that she read two to three Korean books and a short online English storybook in a day. She used online English-speaking tools, which were provided for free for every learner. On weekends, she watched English videos on YouTube or English movies for fun. Jiwon enjoyed studying English and used various online resources to study English by herself. In the English Achievement Test, held prior to the interview, Jiwon answered 29 questions out of 34 questions correctly, which was the highest score among the three participants.

Her goal in learning English is to read different types of texts written in English and translate the texts naturally within the context so that she can help other friends who have difficulty understanding the texts. She also feels the need to communicate with people from different cultural backgrounds with

English in case she travels abroad. Jiwon reported that her main concern in studying English is vocabulary knowledge. Therefore, before participating in this study, she usually used Naver English Dictionary (NED) or Papago, which is a translator function of NED.

Junseo started to learn English when he was a second grade student in elementary school. He has never been to an English-speaking country and has been studying English at hak-won after class. He studied English three times a week for an hour. At the time of the study, he usually studied English by reading the text and solving the reading comprehension questions. According to his report, he practiced reading the text and translating English into Korean, and Korean into English. He read one to two Korean books in a week, but he was not usually interested in reading a book because he thought that it took a lot of time and effort to do so. He was, however, interested in reading books about soccer players because his dream is to be a soccer player. In the English Achievement Test, held prior to the interview, Junseo answered 25 questions out of 34 questions correctly.

Junseo's goal in learning English is to speak English fluently and communicate with native English speakers. He is interested in pronouncing English words properly because he feels his pronunciation sometimes hampers his communication. Junseo had been told by his hak-won teacher that he

needed to pronounce more properly in order to convey meaning well. Junseo also reported that he had difficulty understanding long sentences written in English due to his lack of vocabulary knowledge. Before participating in this study, he frequently used NED to translate reading assignments from hak-won written in English.

Juyeon started to learn English when she was 10 years old, as a third grader at elementary school. She had been studying English from third to fifth grade at hak-won after class, but now she only studies English at school. She studied English only with the school's English textbook and had never read English texts online. Juyeon had a relatively low level of English proficiency compared to two other participants; she answered 15 questions out of 34 questions correctly. Juyeon reported that she could understand 60 to 80 percent of the 6^{th} grade English textbook without the help of an English dictionary. She enjoyed reading comic books or novels in Korean, but she preferred to use YouTube more in her free time.

Juyeon usually enjoyed various topics of videos online from games to cooking. Mostly, the videos were related to her hobbies. Juyeon reported that she studies English to understand the videos of her favorite YouTube creator, who makes content with English native speakers. However, she was not interested in studying English because it was difficult to study. Therefore, she

reported that she rarely used an English dictionary compared to YouTube. She thought that her difficulties in studying English were reading and listening due to her limited English vocabulary knowledge. She said that she could understand the meaning of English words only if she knew how to read the word.

The three students' English proficiency levels differed from each other. Juyeon was relatively less proficient than others and showed less interest in studying English. Jiwon and Junseo showed favor in reading. Among the three students, Jiwon particularly enjoyed reading both online and offline, in Korean and English.

In case of the online reading and hypertext materials, two of the participants, Junseo and Juyeon, had relatively insufficient experience with reading online text compared to Jiwon. However, all the participants have experience using Naver English Dictionary (NED) and Naver Encyclopedia (NE) to search for unknown words or concepts. They usually used YouTube to look up interesting video clips in their free time. The following section introduces online reading text and three hypertext materials.

3.2 Instruments

In this section, the instruments that were provided to participants are presented, and the hypertexts that were designed by the researcher are introduced. These hypertexts refer to the text embedded by hyperlinked online resources. The participants utilized hyperlinked online resources to support their comprehension while reading English text. The first subsection deals with the background information interview questions provided to the students.

3.2.1 Background Information Interview Questions

Before the main session began, participants' background information was collected through a structured interview. The background information interview questions were designed and modified in reference to previous research (Huh, 2012; Kim & Kim, 2010) (Appendix 1).

The interview consisted of 24 questions. The first part of the interview, section A, consisted of six questions related to the English learning method. Section B included three questions regarding interest in learning English. Section C contained six questions concerned with reading experience both in Korean and English. Section D contained two questions about familiarity with the computer and other electronic tools. Section E included seven questions

regarding the online reading experience.

3.2.2 Hypertexts

This study focused on exploring readers' English reading process assisted by hyperlinked online resources. As seen in Figure 3.1, The text embedded with hyperlinks is referred to as "hypertext" (Coiro, 2011), which was designed to provide the user quick access to information sources such as a dictionary, encyclopedia, or search tools. Considering that participants are young learners who are generally understood as being in the state of cognitive and linguistic development, the English text was designed as hypertext by embedding hyperlinked online resources of NED, NE, and YouTube to aid their comprehension. In line with the participants being young learners, three types of online resources were hyperlinked for this study because they tended to have difficulty using other types of resources that do not align with their preference or experience with the tools (Shin et al., 1994).

Figure 3.1 The Display of Hypertext Used in Session 10

< So Colorful! >

Fall is a season of change.
As the weather gets colder, acorns, apples, pumpkins, and leaves change color. Take a look.
가을의 모습
Acorns turn brown.
Chipmunks gather and eat acorns. They store them for the winter.
Apples turn red. Apples ripen in the fall. Ripe apples can also be green, pink, or yellow.
Pumpkins turn orange. Pumpkins grow on vines.
They turn orange when they are ripe. 호박이 자라는 모습
Leaves turn yellow.
Tree leaves change color in the fall. They can turn yellow, orange, red, or brown. 가을 낙엽이 생기는 이유

네이버사전

네이버 백과사전

유튜브

Regarding the English texts used in the hypertext, texts with many words in a sentence would become a cognitive burden on students. Therefore, as mentioned in the Korea 2015 Revised National English Curriculum (RNEC), English text was restricted to under nine words per sentence. Aside from science terminology used in the text, frequently used English words in the RNEC word lists were also considered to help young readers understand the text easily. To elicit students' use of diverse hyperlinked online resources to support their English reading depending on their individual needs, this study

chose the expository text from *TIME for Kids*[1] instead of the narrative text.

The text deals with science topics such as animals, insects, plants, environments, and space, which are generally learned in school or experienced in students' daily lives. According to previous studies (Chen & Yen, 2013; Lenders, 2008), students tended to use hypertext materials more actively in expository texts than in narrative texts. A total of 16 expository texts were chosen from the *TIME for Kids* article that was geared toward kindergarten to first-grade readers of the United States. The article has a Flesch-Kincaid Grade Level of 0 to 3.

The longest text has a total of 160 words, and the average text is approximately 133 words. The texts were provided to the participants during the online reading task sessions. The example English texts used in this research are provided in Appendix 2.

The English text was embedded with hyperlinked online resources and was presented on the computer screen using PowerPoint software. On the screen, the embedded hyperlinks were written in bold type font, colored blue, and underlined to be distinguished from other text, as seen in Figure 3.1, which

[1] http://www.timeforkids.com

is mentioned above.

The hyperlinks in this study were presented as word type and phrase type. The word-type hyperlinks were connected directly to the word meaning presented by NED. The phrase-type hyperlinks were presented next to the content-related sentence. Such phrase-type hyperlinks were linked with the content from NE and YouTube, which were expected to be helpful to readers' understanding of the domain-specific science words or concepts by the researcher. The phrase-type hyperlinks of online resources were written in Korean in order to decrease the cognitive demand of readers with low proficiency or background knowledge. Due to the lack of linguistic knowledge or content knowledge, the readers would have difficulty inferring the meaning of phrase-type hyperlinks written in English, which would place more demand on reading (Mcnamara et al., 2011).

At the bottom of the hypertext, the main entrance pages of three hyperlinked online resources were presented. It was designed to help students access each resource more easily when they want to find information aside from pre-determined information provided by the researcher.

According to previous research, low-level learners tend to have difficulty understanding low-coherence expository texts that contain unfamiliar concepts or ideas. They require support in reading, such as

modification of difficult words or additional background information to comprehend the low-coherence text effectively (Mcnamara et al., 2011; Shin et al., 1994). Therefore, considering the participants' language proficiency, this study chose information from NE and YouTube prior to online reading, which supplied background information left unstated in the text. As seen in Figure 3.2, the word-type hyperlinks navigate the participants to the designated word meaning of NED. The phrase-type hyperlink navigates the participants to the information on YouTube and NE provided by the researcher, as seen in Figures 3.3 and 3.4. Each English text included an average of fourteen hyperlinks linked with NED, and two to three hyperlinks were linked with NE and YouTube, respectively. Two elementary school teachers checked these pre-determined hyperlinked online resources for the appropriateness of online resources chosen by the researcher.

Figure 3.2

The Display of Naver English Dictionary Hyperlinked with English Text (Session 10)

Figure 3.3

The Display of YouTube Hyperlinked with English Text (Session 10)

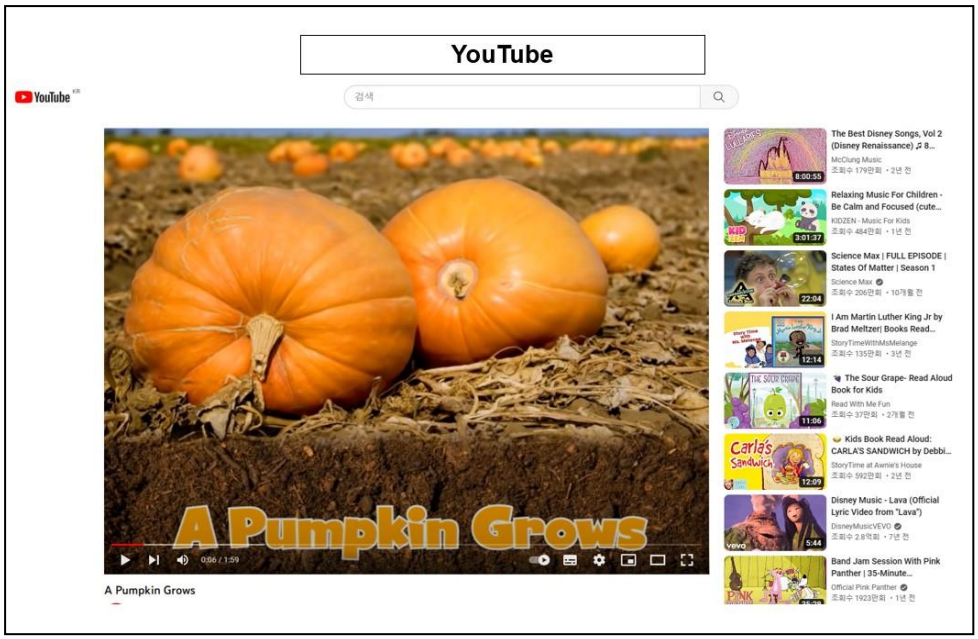
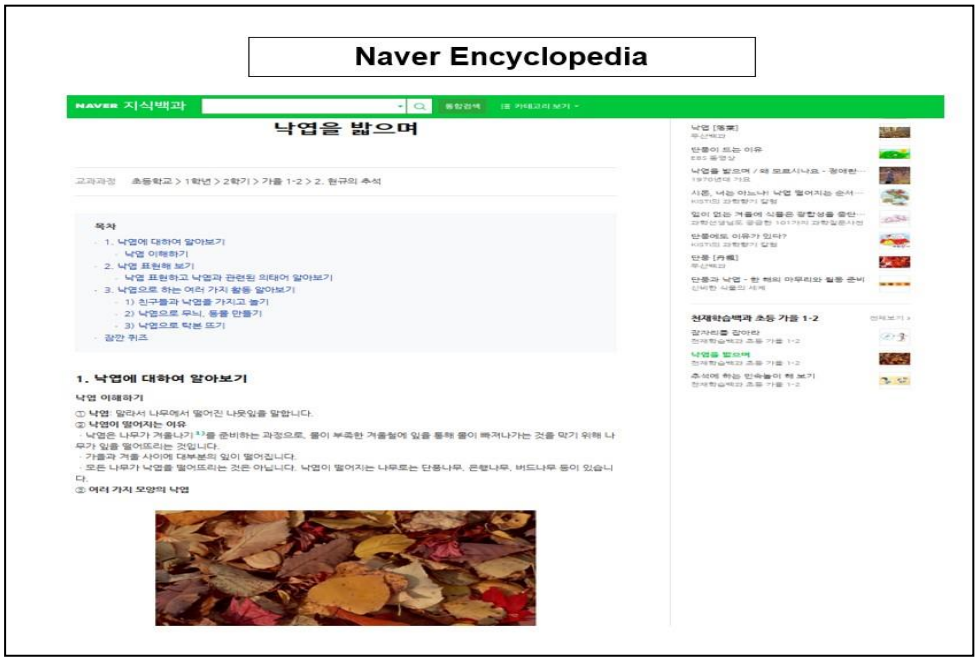


Figure 3.4

The Display of Naver Encyclopedia Hyperlinked with English Text (Session 10)

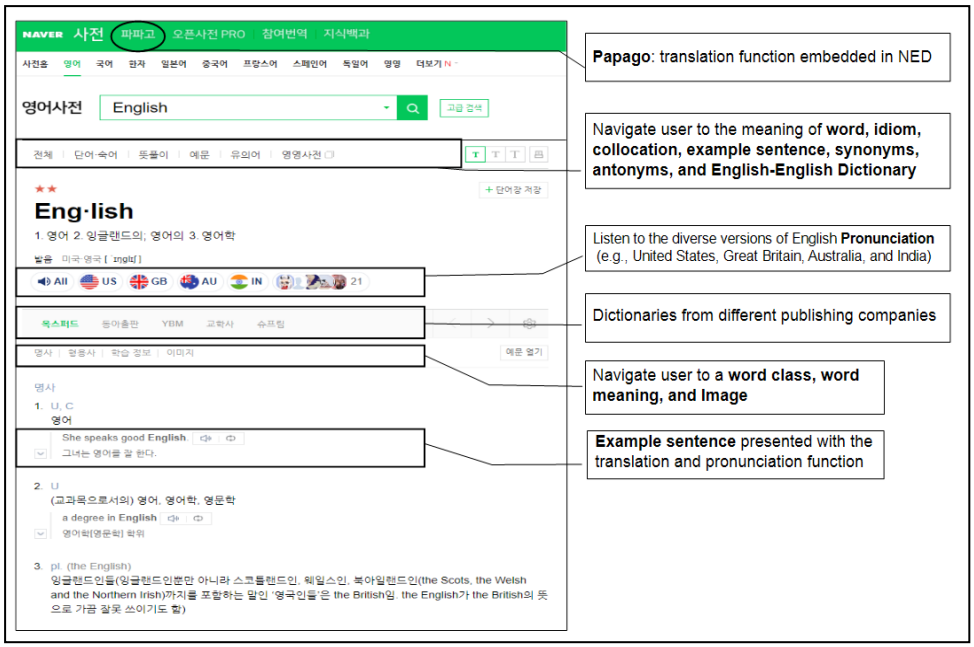


When the participants click the main entrance page of each hyperlinked online resource located at the bottom of the hypertext, they can use diverse functions of each online material (e.g., NE, NED, YouTube) freely aside from the contents provided by the researcher.

For example, when students click the main entrance page of the NED linked in the hypertext used in this study, they can navigate through various functions, as presented in Figure 3.5. NED provides English-Korean, Korean-English, and English-English dictionaries on the same page. Readers can learn various linguistic information by clicking example sentences, synonyms, and

antonyms. They can also search for idioms or collocations. They can even use the translation function, Papago, embedded in the NED. Listening to pronunciation is also available with a click of a speaker icon. The pronunciation function provides various pronunciations from speakers of different English-speaking countries such as Australia, India, or Great Britain.

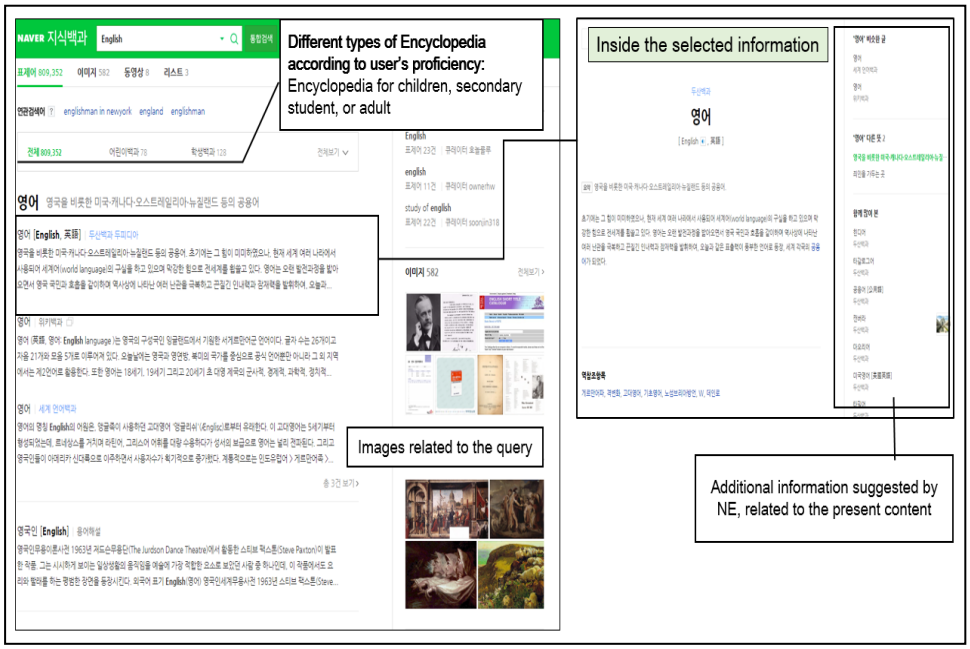
Figure 3.5 The Features of Naver English Dictionary (October 23, 2022)



Another type of online resource used in this study is the NE. It is commonly used to search for unfamiliar or unknown concepts while reading. NE contains encyclopedias from various publishing companies. It even consists of Wikipedia, which is collaboratively developed by various users online. NE provides a wide range of information regarding different literacy levels or

reader ages. For example, when young readers enter NE through the link, they can select children's encyclopedias among various encyclopedias. NE provides readers with a "related-information function" that enables them to move on to related information that attracts their attention while reading. Information in NE is paired with videos, texts, graphs, or pictures that best describe the type of content.

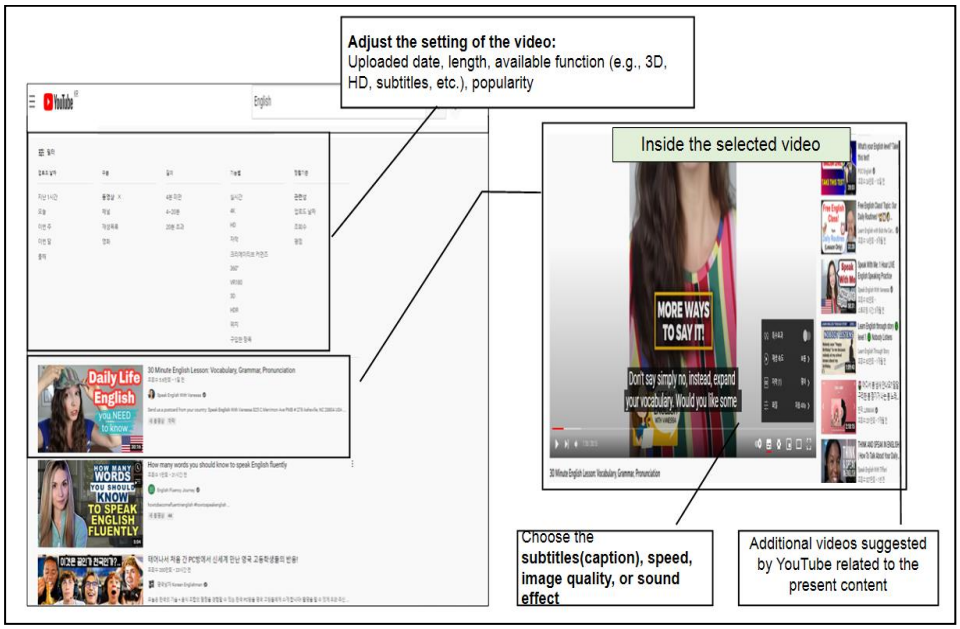
Figure 3.6 The Features of Naver Encyclopedia (October 23, 2022)



YouTube is the last online resource used in this study. YouTube is the world's most popular audio-visual video streaming platform that presents information through video. The videos created by users are shared with other users on the net. A participant can adjust the setting of the video and arrange

the order of the video by uploaded date, length, or popularity. The participant can select a video and click the setting button on the video, which shows the functions of subtitles, speed control, image quality, and sound effect. Other videos related to the present content are also presented beside the video, which provides participants with various choices.

Figure 3.7 The Features of YouTube (October 23, 2022)



At the orientation session, three online resources were introduced to the students: NED, NE, and YouTube. Both NED and NE are Korean-based monolingual websites, whereas YouTube is an English-based website. As seen in Appendix 3, the orientation included some guidelines for Internet users and an explanation of diverse functions in three online materials (e.g., NED, NE,

YouTube). Students were also provided with the example hypertext used in the study, which consists of the English text embedded with hyperlinked resources. They were informed to click the pre-determined hyperlinks (e.g., word type, phrase type hyperlinks) whenever they wanted to based on their reading difficulty, interest, or curiosity. The students were also allowed to search voluntarily based on their reading purpose with access to the main entrance of each hyperlinked online resource (e.g., NE, NED, YouTube).

In the actual reading sessions, there was no time limit in this English reading embedded by hyperlinked online resources. Table 3.1 shows the amount of time students spent reading assisted by hypertext materials in terms of maximum, minimum, average, and total time span of the sixteen online reading tasks. It can be implied that Juyeon spent relatively more time than the two other participants.

Table 3.1 The Amount of Time Spent on Online Reading Tasks by Individual Participants

	Minimum*	Maximum*	Mean*	SD	Total*
Jiwon	7	21	16	4	250
Junseo	9	23	15	3	241
Juyeon	19	35	26	4	411

*Unit: minutes

3.2.3 Comprehension Questions

After the main reading tasks, the participants were given printed comprehension questions for learners to review what they had read in the text. The comprehension check questions included fewer than six questions asking about implicit or explicit information in the text, and participants wrote down short answers in sentences. According to previous studies, comprehension questions facilitated readers to read thoroughly during the reading process (Cerdán et al., 2009). It would help the researcher to observe students' use and perception of hypertext materials in their English reading in diverse perspectives. Therefore, answering the comprehension questions had the sole purpose of eliciting participants to focus more on the online reading process. Students' response to the comprehension questions were not evaluated or calculated as data in this study (Appendix 4).

3.2.4 Semi-structured Interview Questions

After the comprehension check, participants were provided with 10 minutes of break time, after which an individual semi-structured interview was conducted with each participant. The semi-structured interview was designed to make up for the think-aloud protocol used in the online reading task, which was performed prior to the interview. As the participants were young learners

who felt more cognitive burden during the reading process, the semi-structured interviews would make readers feel more comfortable expressing their thoughts and feelings than think-aloud alone, due to the existence of an interlocutor (Hamdan et al., 2017). The questions were designed in reference to previous research (Huh, 2012; Min, 2017; Park & Kim, 2013) (Appendix 5).

The semi-structured interview was divided into two sections and included a total of nine pre-determined questions. Additional questions were added based on the participants' answers at the time of the interview. Section A was designed to understand the participants' reading process, which contained six questions. Section B was composed of three questions, regarding the use of hypertext materials by participants during the reading process.

3.2.5 Final Interview Questions

In the last session of the online reading task, the final interview was given to the participants immediately after the semi-structured interview. The final interview also had the form of a semi-structured interview so that additional questions could be given to the participants as derived from their replies. There were a total of six pre-determined questions divided into three sections. Section A contained two questions dealing with the participants' use of hypertext materials during the reading process and Section B contained one

question concerned with the participants' perception of reading online assisted by hypertext materials. Lastly, Section C included three questions regarding affective factors such as participants' motivation, interest, and self-growth during the online reading assisted by hypertext materials (Appendix 6).

3.3 Data Collection

This research uses qualitative methods to investigate the EFL elementary school students' reading process assisted by hyperlinked online resources. This section summarized the whole progression of data collection. Followed by the whole progression, the think-aloud protocol used during the reading process is introduced.

Data collection began once the Ethics Committee of the Institutional Review Board (IRB) of Seoul National University approved the process of the study. Three 6th grade elementary students from the researcher's school who voluntarily applied for the study were recruited as participants. The time for data collection was adjusted flexibly based on the participants' schedule after school. Each participant took part in this study one to two times per week. The study was conducted from May 2022 to August 2022, with a total of sixteen sessions. The places for data collection were mainly a quiet classroom or a

computer lab in the participants' school.

Prior to the main session, participants' background information was collected through a structured interview. After the interview, orientation on the procedure, think-aloud protocol, and guidelines for using hypertext materials, Naver English Dictionary (NED), Naver Encyclopedia (NE), and YouTube was provided to the participants.

The main session started one week after the background interview and a total of 16 sessions were employed. The task was conducted on an individual participant on different days based on each participant's schedule after school. In each session, each participant went through three types of tasks, which were conducted sequentially on the same day. First, an online reading task assisted by hypertext materials was conducted. Second, reading comprehension check questions were provided to the individual participant right after the online reading task. Third, participants were engaged in semi-structured interviews after the comprehension check. The questions were concerned with the use of hypertext materials during online reading and their thoughts and feelings evoked during the online reading process. The time of each task was not restricted so that students were able to participate comfortably according to their different proficiencies or learning styles.

In the 16 main sessions, the participants were involved in independent

reading, which was screen-recorded by the online meeting platform Zoom. During the reading, only the participants' online reading process on the computer screen and the participants' voices at the time of the reading process were recorded. To protect the participants from unwanted exposure of their identity, the video function of Zoom software was deactivated prior to the main session.

On the last day of the main session, the final interview was conducted with the participants right after the semi-structured interview. The interviews were recorded with the audio-recording application of the iPhone. The main session tasks, which were online reading process assisted by hypertext, semi-structured interview, and final interview were later transcribed and translated into English and analyzed.

3.3.1 Think-aloud Protocol

This study used a think-aloud protocol during the online English reading tasks embedded with hypertext materials. Prior to the task, the participants were instructed on how to verbalize their thoughts and ideas while reading the online reading material assisted with the hypertext materials. Instructions specifically demonstrated that participants were required to verbalize anything that the text made them think about regarding the information they encountered

while reading, difficulties they faced while comprehending the text, their choice of different types of hypertext materials, and their feelings or thoughts related to the content. The participants were encouraged to make comments whenever they wished, but they were encouraged to comment on each sentence they read and the decisions they made regarding the use of each hypertext material they selected or searched for. The researcher demonstrated how to comment on the text by using the sample reading material embedded by hyperlinked online resources similar to the actual task. The sample reading material had similar features to the actual task in order to familiarize the students with the online reading task environment embedded with the hyperlinked resources. It also enabled students to understand how to verbalize their decision-making process in the hyperlink selection (e.g., whether or not to choose the pre-determined hyperlinked online resources, whether to search for additional information to solve their curiosity). After the demonstration, students were asked to think aloud for another sample reading text with a different topic provided by the teacher. Then, the participants were provided with positive feedback from the researcher, which encouraged young readers to verbalize their thoughts and ideas with confidence and ease (Goldman et al., 2012).

3.4. Data Transcription

The screen-recorded online reading process with think-aloud protocol and interview data were transcribed and analyzed in detail. The online reading process on screen was transcribed in a unit of events that described individual students' use of hypertext materials during the online reading process. The think-aloud data of online reading were transcribed in the same way as the transcribed events and written together on the same page. The data of each event was transcribed according to the protocol introduced in Table 3.2, which is adapted and modified from Min (2017). The interview data were transcribed in texts according to meaningful units of texts. The meaningful unit refers to one or two sentences that contained the thoughts or ideas of participants. The method used in data analysis is presented in Section 3.5.

Table 3.2 The Protocol to Transcribe the Online Reading Process (Adapted and Modified from Min, 2017)

#: The number of events
[HT]: The type of hypertext used
[PD]: Pre-determined hypertext materials
[SK]: Skipped pre-determined hypertext materials
[VL]: Voluntary use of hypertext materials
[OR]: The type of an online resource used
[NE]: Naver English Dictionary [NED]: Naver Encyclopedia [Y]: YouTube
XX: Search terms (i.e., a single word or phrase in Korean or English)

(T): The synchronous think-aloud data

>: The change of the reader's activities or borders between the activities

R: The result of the search (i.e., what the online resources display as a result)

A: Observed actions or strategies in response to the result

E: Evaluation of the result after interacting with the online resource

Table 3.3 Example of the Transcription of Online Reading Process

#: 1

How do you and your community use water?

[PD]

[NED]

XX: *community*

(T): I guess it means 공동체 in Korean. Let me see. I will click this word.

>

R: 주민, 지역사회, 공동체

A: Move the cursor to the word meaning. Choose an appropriate meaning.

E: I will just choose "주민" in this option. It is the most appropriate meaning that goes well with the context.

3.5 Data Analysis

This study used a qualitative method to explore the use and perception of hypertext materials in the online reading process. The transcribed data of the screen-recorded online reading process with think-aloud protocol and the interview data (semi-structured interview, final interview) were analyzed in thematic analysis to investigate the use of hypertext materials while reading and the perception of the participants while reading assisted by hypertext materials, respectively.

3.5.1 Analysis of Reading Process

To analyze the participants' use of hypertext materials while reading online, this study conducted an open coding of data (Stauss & Corbin, 1990). Therefore, as seen in Table 3.4, the coding scheme was developed inductively from a bottom-up approach of participants' actual use of hypertext materials while reading. It allowed the possibility of figuring out any purpose of using hypertext material that had not been identified previously. The data from the online reading process assisted by hypertext materials explored the purpose of participants' use of each hypertext material at each event of the reading process and the online reading strategies. The data of the online reading strategy and the recurring event were identified and categorized as code. The emerging event was added to the final taxonomy of categorization only after it was

examined repeatedly and sorted thoroughly in comparison to the existing data and verified as essential for categorization. The final coding scheme was reviewed by an outside reader, who is majoring in applied linguistics.

Second, the frequency of the use of each hypertext material was calculated after the events were coded. The participants' pattern of using hypertext materials was examined along with the participants' online reading behavior and strategies. The interview data was used to substantiate the analysis of the participants' use of hypertext materials in online reading.

Table 3.4 The Coding Scheme for the Reading Process Assisted by Online Resources Transcript

Coding Category	Code
Online Dictionary	
1. Search for the meaning of an unknown word or a string of unknown words (phrase)	D1
2. Search for other appropriate meaning of a word that goes well with the given context	D2
3. Search for meaning of a phrase or sentence with a translation function (Papago)	D3
4. Search for the refined meaning of a phrase or sentence with a translation function (Papago)	D4
5. Search for an English equivalent for a single word in Korean	D5
6. Confirm the meaning of uncertain words or phrases	D6
7. Check what was written in the query to see whether it is correct (e.g., spelling, punctuation)	D7

8. Correct the error of typed words or phrases in the query	D8
9. Listen and repeat to the pronunciation of words or phrases	D9
10. Read the Korean pronunciation of the English words, phrases, or sentences in the translation function	D10
11. Etc. (e.g., click the example sentences, adjust the size or location of pop-up windows, search for other functions in the website)	D11
Online Encyclopedia	
1. Search for unknown word or phrase in the given text	E1
2. Scan or skim the text	E2
3. Read the text closely in detail	E3
4. Reread the content.	E4
5. Search for additional information derived from the previous content (e.g., click the related information)	E5
6. Evaluate the appropriateness or reliability of the content	E6
7. Narrow down the query words and re-searches	E7
8. Seek diagram, movies, pictures, and chart to help understand the texts	E8
9. Etc. (e.g., adjust the size or location of pop-up window, underline the information with a cursor)	E9
YouTube	
1. Search for unfamiliar or unknown information	Y1
2. Search for the entertaining or interesting information	Y2
3. Evaluate the appropriateness or reliability of the information on video	Y3
4. Turn on captions (subtitles) while watching the English video	Y4

5. Etc. (e.g., listen to the sound of video without watching the screen, read the explanation of video, elaborate the search setting of video according to length or uploaded time, adjust the volume of the video, change the size of video to a full screen, use the progress bar to check the time left or preview the scene, adjust the speed of video, fast forward or rewind the video)	Y5

3.5.2 Analysis of Interviews

The analysis of the interviews is based on grounded theory (Stauss & Corbin, 1990). The data from the transcribed interviews were analyzed with the inductive method, which segmented meaningful units of sentences. The transcribed interviews were then categorized into keywords, and the keywords were categorized as subthemes regarding their various properties and aspects. The recurring subthemes were categorized as core themes. The cycle of identifying the core themes continued until it reached data saturation (Glaser & Strauss, 1999). The coding scheme for the interview transcript is presented in Table 3.5. As seen in Table 3.5, the interview data set was categorized into the use of hypertext materials and online reading process. The use of hypertext materials was then sub-categorized into advantages and disadvantages of each hypertext material, the purpose of using hypertext materials, information learned from hypertext materials, and individual pattern of using hypertext materials. The online reading process was subcategorized into perceptions

about learning English, perception change(s) toward learning English by using the hypertext materials in their reading, and behavioral features of online reading,

The data from the online reading process, think-aloud protocol, and interview data were triangulated in the analysis to corroborate the participants' use and perception of hypertext material while reading online.

Table 3.5 The Coding Scheme for Interview Transcript

Use of the hypertext materials
1. Advantage(+) and Disadvantage(-) of hypertext materials: Online Dictionary (D+/D-), Online Encyclopedia (E+/E-), YouTube (Y+/Y-)
2. The purpose of navigating hypertext materials: Interest (In), Curiosity (C), Knowledge (Kn), Entertain (E)
3. Information learned from hypertext material (I)
4. Patterns of using hypertext materials (P)
Online reading process
1. Perceptions about learning English (PE)
2. Perception change(s) toward learning English (PC)
3. Behavioral features of online reading (B)
4. Evaluation of reading online via computer screen compared to printed text (OR)

In the following chapters, the results of the analysis are presented in each chapter. Each participant's use of hypertext material is presented in terms of two research questions. The online reading process is described in detail to understand the overall pattern of participants' online reading process, which is supported by the online strategies used by the participants and the purpose of navigation.

CHAPTER 4

RESULTS AND DISCUSSION

Chapter 4 presents the findings regarding the three participants' different use of hyperlinked online resources in terms of cognitive and affective development. Section 4.1 compares the three participants' use of hyperlinked online resources in English reading and their perceptions of the different online resources used in reading. Section 4.1 comprises three subsections. Section 4.1.1 presents the readers' use of pre-determined hyperlinked online resources in English reading. Section 4.1.2 summarizes the readers' voluntary use of hyperlinked online resources in English reading. Lastly, Section 4.1.3 introduces the readers' perceptions of the use of hyperlinked resources in reading. Section 4.2 discusses the potential of English reading supported by hyperlinked resources; Section 4.2.1 discusses the positive influence of hyperlinked online resources on EFL readers' cognitive and affective domain and Section 4.2.2 the value of reading experience and practice.

4.1 Comparison of the Three Readers' Use of Hyperlinked Online Resources in English Reading

During the English reading process, the main purpose of the use of hyperlinked online resources was to allow the students to solve the problems they faced in English reading online that resulted from their deficit of lexical knowledge or content knowledge. To illustrate the feature of each participant's use of online resources in English reading, 16 original reading sessions were re-categorized under three phases of sessions.

The hypertext reading sessions 1–6 were re-categorized as "Phase 1," which was the beginning phase of the use of hyperlinked online resources. Following Phase 1, the hypertext reading sessions 7–11 were recategorized as "Phase 2," which was the intermediate phase among the whole reading sessions. Lastly, hypertext reading sessions 12–16 were categorized as "Phase 3," which represented the final phase of the whole reading sessions. The use of hyperlinked online resources was divided into (1) the use of pre-determined hyperlinked online resources and (2) the voluntary use of hyperlinked online resources. Table 4.1 introduces the number of pre-determined hyperlinked online resources in each session according to the different types of online resources.

Table 4.1

Total Numbers of Pre-Determined Hyperlinked Online Resources in Each Session

	Phase 1						
Session	**1**	**2**	**3**	**4**	**5**	**6**	**Total**
NED	14	14	15	14	16	13	86
NE	1	2	1	1	1	2	8
YouTube	2	2	1	2	2	2	11
Total	17	18	17	17	19	17	105
	Phase 2						
Session	**7**	**8**	**9**	**10**	**11**		**Total**
NED	15	17	17	16	17		82
NE	1	1	1	1	1		5
YouTube	2	2	3	1	2		10
Total	18	20	21	18	20		97
	Phase 3						
Session	**12**	**13**	**14**	**15**	**16**		**Total**
NED	17	16	16	15	18		82
NE	2	1	1	1	1		6
YouTube	2	2	2	2	2		10
Total	21	19	19	18	21		98

4.1.1 Readers' Use of Pre-Determined Hyperlinked Online Resources in English Reading

To clarify the purpose of students' use of hypertext materials in online English reading, the ratio of the numbers of uses of pre-determined hypertext materials out of the total pre-determined hypertext materials was calculated. Figure 4.1 summarizes the percentages of the use of pre-determined hypertext materials out of the total pre-determined hypertext materials in each online reading session.

Figure 4.1

The Graph of Readers' Use of Pre-Determined Hyperlinked Online Resources in the 16 English Reading Sessions

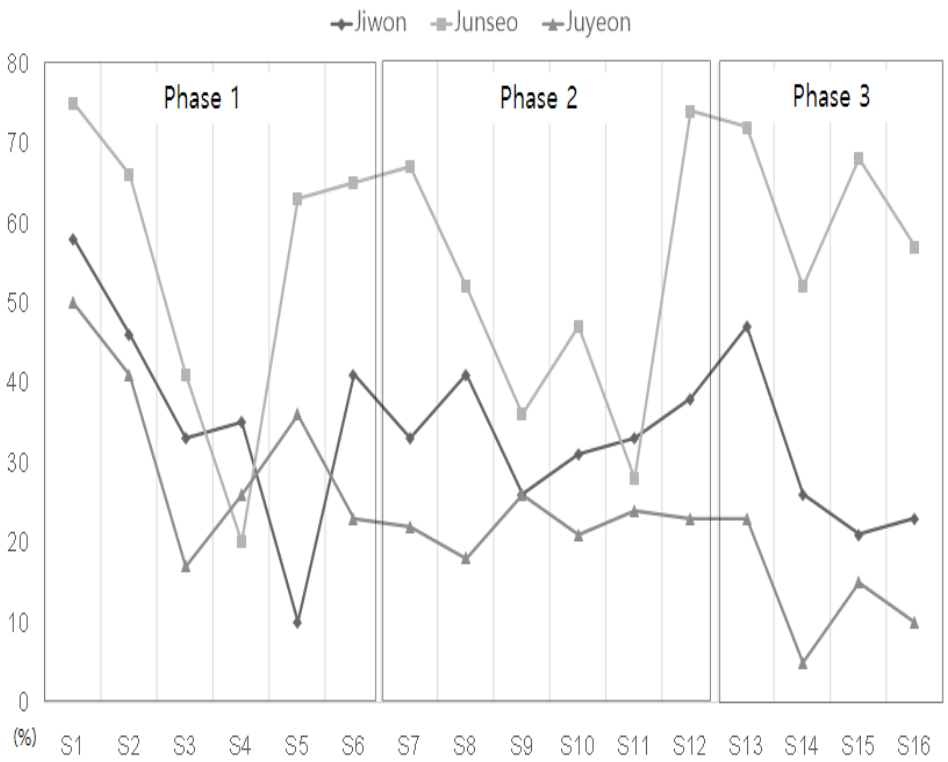


Table 4.2

Readers' Use of the Pre-Determined Hyperlinked Online Resources in the Three Phases

	Phase 1		Phase 2		Phase 3	
	Mean*	*SD*	Mean*	*SD*	Mean*	*SD*
Jiwon	37	14.6	33	4.8	31	9.9
Junseo	55	18.7	46	13.4	64	8.6
Juyeon	32	11.3	22	2.7	15	7.1

*unit of mean: percentage (%),

*Phase 1: S1–S6, Phase2: S7–S11, Phase 3: S12–S16

As can be seen in Table 4.2, the three participants tended to show noticeable variances in their use of pre-determined hyperlinked online resources among the pre-determined hypertext materials within Phase 1 in comparison with Phases 2 and 3. Based on Figure 4.1, the participants showed higher proportions of the use of pre-determined hyperlinked online resources in the first two online reading sessions in Phase 1 than in the four other sessions. In the semi-structured interviews with the three participants as presented in the excerpts below, the participants stated that they were curious about what would appear if they clicked the hyperlinks. In the online reading task of Session 1, the participants clicked the pre-determined hyperlinked online resources 20 percent more often than their average use of pre-determined hyperlinked online resources in the other sessions in Phase 1 for feature exploration and to search

for unknown words or phrases. Hence, the variances in Phase 1 were likely to have been influenced by the participants' unfamiliarity or inexperience with the use of hyperlinked online resources in their reading.

> Excerpt 4.1 Though I knew what *"January"* meant in Korean, I was curious about what would likely appear if I clicked this word. (Quote from Jiwon's semi-structured interview in Session 1)

> Excerpt 4.2 At the beginning of the reading, I clicked the word type hyperlinks and contents titles, because I was curious about what was about to pop up. (Quote from Junseo's semi-structured interview in Session 1)

> Excerpt 4.3 Though I practiced using the hyperlinked online resources in the orientation session, I was not quite familiar with the use of hyperlinked online resources such as NED, NE, or YouTube, because I have less experience in using hyperlinked online resources to read English text online. So I wanted to check if the hyperlinks were linked to appropriate content that could help my reading. (Quote from Juyeon's semi-structured interview in Session 1)

Throughout the reading session, readers' main concern in online English reading was focused on lexical difficulties, which led them to use NED most frequently. Readers tended to click pre-determined hyperlinked online resources linked to NED when they encountered unknown words or phrases.

For example, Junseo's use of hyperlinks in Session 5 was 40 percent higher than in Session 4 due to the lexical difficulty he felt while reading. Juyeon's use of hyperlinks in Session 5 also increased by 10 percent over Session 4. Conversely, as seen in Figure 4.5, Jiwon used the hyperlinks the least in Session 5 among all 16 sessions. Excerpts 4.4 and 4.5 show Juyeon and Jiwon's different thoughts they had while reading Session 5, "*Inside your mouth.*" Table 4.3 summarizes how Junseo used pre-determined hyperlinked online resources to aid his lexical deficiency. The query term is written in Italics.

> Excerpt 4.4 Though I knew some familiar words such as "mouth" or "lips," there were other science words such as "taste buds" or "tongue." I have never heard of these words before. When I clicked "taste buds," it gave me the Korean meaning "미뢰," which I was not even aware of in Korean. Therefore, I clicked another pre-determined hyperlinked online resources to know what "미뢰" meant. It showed me how the taste buds worked in my tongue with animation through YouTube, which was much easier to understand. (Quote from Juyeon' semi-structured interview in Session 5)

> Excerpt 4.5 The topic was easy to understand. I already knew some words about the body parts. Therefore, I skipped some hyperlinks linked with NED. Because I felt it is a waste of time to click the words again. But the hyperlinked video about "*the function of each tooth*" was very helpful. I could learn many interesting facts about teeth in our mouth. It made reading much more exciting. (Quote from Jiwon's semi-structured interview in Session 5)

Table 4.3

Example of Junseo's Use of Pre-Determined Hyperlinked Online Resource in Session *5*

Session 5	
Problematic sentences	Your mouth has gums. Gums protect the teeth.
Type of use	Pre-determined hyperlinked online resource
Resource	NED
Query term	*gum*
Query results	1. 잇몸, 치은 2. (나무에서 나는) 고무진, 3. 풀칠을 하다
Evaluation of the result	"Wow. There are lots of meanings that I did not know about *gum*. I thought it meant chewing gum that I like. But it was awkward to translate gum with 'chewing gum' in these sentences. Then it would mean 잇몸 in these sentences. But I am not sure. Maybe I should read one more sentence."
Observed strategy	Listen to the pronunciation and repeat Read the next sentence and return to click the word "*gum*" again
Type of use	Pre-determined hyperlinked online resource
Resource	NED
Query term	gum
Observed strategy	confirm the meaning of the unknown word
Evaluation of the result	"Ok. So it means '잇몸' in Korean. Now I understand what this paragraph meant. It is interesting to know that gum is not just 'chewing gum' in English. I might have

	translated it strangely if I had not checked the meaning of 'gum' in these sentences. What a relief!"

> Excerpt 4.6 At first, when I translated the word *gum* with the meaning of "chewing gum" it felt a little bit awkward. So, I clicked the word "gum" in the passage and chose the meaning related to the body parts. Then I moved on to the next sentence. But there was another "gum" in the sentence. So I wanted to check the word again to confirm if the meaning I chose is correct. It was interesting to know that one word has many meanings. (Quote from Junseo's semi-structured interview from Session 5)

The use of pre-determined hyperlinked online resources led each participant to acquire both the literal and contextual meaning of the word. As seen from Excerpt 4.6, it also made students acquire background knowledge that helped them comprehend the text accurately and read it with interest.

Moreover, what was notable in the use of pre-determined hyperlinked online resources was that students were likely to develop their own goals and the relevant reading strategies to reach reading comprehension with the use of pre-determined hyperlinked online resources. For example, in Phase 1 the readers were likely to click the pre-determined hyperlinked online resources linked to NE or YouTube randomly without any specific reading goals. However, as they moved on to Phase 2 and Phase 3, they were likely to show

various strategies for effective goal accomplishment. In the case of Jiwon, her goal of the use of pre-determined hyperlinked online resources was “read to learn” or “watch to learn.” She clicked the pre-determined hypertext materials expecting to learn something new related to the online English texts, and then organized the information she encountered to better comprehend the information. Jiwon tried to actively use the background knowledge she acquired from hyperlinked online resources in comprehending the English texts in each reading session. Table 4.4 represented how she organized the information and integrated the information into English reading.

Table 4.4

Examples of Jiwon’s Use of Pre-Determined Hyperlinked Online Resource Session 13

Session 13	
Type of use	Pre-determined hyperlinked online resource
Resource	NE
Query term	*Hibernation of animals in winter*
Query results	(summarized excerpt from the NE) Squirrels sleep throughout the winter, but they sometimes wake up in order to eat food they had stored before. Raccoons also sleep during the winter. They sleep under the tree or inside the den in order to protect themselves from cold weather. Frogs or snakes sleep during the winter. They sleep inside the soil to keep their body

	temperature to a certain level. Bears sleep during the winter. They have difficulties finding food during the winter, so they eat a lot of food in the previous season and sleep in the cave during the winter. 
Observed strategy	Read the text in detail Compare the similarities and differences in the given information Summarize the text
Evaluation of the result	“Ok. There are many similarities among different types of animals. Many animals sleep during the winter to keep their body temperature to a certain degree. They wake up during sleep in order to eat food. But the place of hibernation is somewhat different from each animal.”
Observed strategy	Move on the read the next sentence. “Bears fill up on food.”
Evaluation of the result	

	"As I understood from the previously read hypertext materials, bears hibernate due to their difficulty in finding food during the winter. Hmm... so 'fill up on food' means storing food inside their stomach? I think it would be appropriate if I understand the sentence in this way."

As for Junseo, he was the most frequent user of pre-determined hyperlinked online resources among the three participants. Similar to Jiwon, Junseo's goal was centered on accumulating background knowledge in science and filling in information gaps in his background knowledge. Until the online reading Session 5 in Phase 1, he frequently used the strategy of "read the text slowly," regardless of the topic or length of the explanation presented in NE. However, from Session 6 he skimmed through the text first and decided what to read in detail and what to skip. When the information was familiar, he skimmed the text quickly or skipped specific parts. In contrast, when the information was new to him, he read the text slowly and in detail, and reread the text when he could not sufficiently understand the given information. Table 4.5 presents Junseo's reading process in Session 14. According to the final interview, as quoted in Excerpt 4.7, Junseo indicated that deciding what to read or skip when reading the hyperlinked online resources made him remember the important ideas well.

Table 4.5

Example of Junseo's Use of Pre-Determined Hyperlinked Online Resource in Session 14

Session 14	
Type of use	Pre-determined hyperlinked online resource
Resource	NE
Query term	*Different methods of seeds propagation*
Query results	(summary) Seeds can be moved by wind, water, and animals.  바람에 날려 전파되는 식물의 씨앗들 씨앗의 운반체로 바람을 선택한 식물들이 많다. 바람을 이용하면 에너지 소비 없이 멀리 씨앗을 전파할 수 있기 때문이다. 식물들은 씨앗에 가벼운 털을 붙여 낙하산처럼 하늘을 날아 멀리 퍼져 나갈 수 있도록 하였다. 하지만 씨앗이 안전하게 살아남을 수 있는 확률이 낮은 단점이 있다. 이 단점을 보완한 것이 씨앗의 대량생산이다. 박주가리 서양민들레
Observed strategy	Skimming and scanning the text Read the text fast
Evaluation of the result	"Ok. So the seeds are spread by the wind or with the help of animals such as bees or furry animals. I have already learned these facts in science class before, so I will move on fast."
Observed strategy	Find out unknown information Read the text in detail Match the images with the explanation

Evaluation of the result	"Wow! I did not know that coconuts float on water to move. It is interesting that they float until they reach the land."

> Excerpt 4.7 In the beginning sessions, maybe the first or second reading sessions, I read the whole information slowly. However, it took much time to read the information, and because there was a lot of information provided at once, it was difficult to remember the key ideas. Therefore, I skimmed the information provided in NE first, and then decided what to read in detail so that I could focus on the key ideas that could help me remember the information well. (Quote from Junseo's final interview)

Juyeon used pre-determined hyperlinked online resources the least of the three participants. She tended to prefer hyperlinked online resources for voluntary use based on her needs, which resulted in the highest frequency of voluntary use of online resources. According to her observed strategies, her use of pre-determined hyperlinked online resources was focused on the topics that interested her. She tended to choose the pre-determined hyperlinked online resources based on her interest in the topics. As seen from Excerpt 4.8, Juyeon was interested in the environmental issues in her daily life. When she saw the content title "How did the trash change into clothes?," she clicked the link because she was interested in preserving the environment and the title matched

her interests. Conversely, Juyeon did not click the pre-determined hyperlinked online resources on YouTube linked to in Session 8, “Hunting for insects.” She indicated in the interview, as quoted in Excerpt 4.9, that she did not like insects. Therefore, Juyeon did not click the pre-determined hyperlink linked to the video “Feature of the walking stick.”

> Excerpt 4.8 I was interested in preserving the environment. Therefore, I watched many contents related to recycling in my daily life. When I was reading the text, the content title next to the sentence caught up my mind. It looked interesting, so I clicked and watch the video. It showed me how bottles can be changed into the clothes we wear, which was new to me. I could learn many interesting ideas. (Quote from Juyeon’s semi-structured interview in Session 15)

> Excerpt 4.9 I did not click the provided hyperlinked online resources in this session. Because I am afraid of insects, I did not want to see the feature of the insect, “walking stick.” (Quote from Juyeon’s semi-structured interview in Session 8)

4.1.2 Readers' Voluntary Use of Hyperlinked Online Resources in English Reading

Aside from the pre-determined use of hyperlinked online resources, readers utilized online resources voluntarily based on their different needs. As seen in Table 4.6, the frequency of the readers' voluntary use of hyperlinked online resources slightly increased from Phase 2 to Phase 3. Throughout the reading sessions the increased voluntary use of hyperlinked online resources led students to develop a "locating information strategy" based on their different needs.

Figure 4.2

The Graph of Readers' Voluntary Use of Pre-Determined Hyperlinked Online Resources in the 16 English Reading Sessions

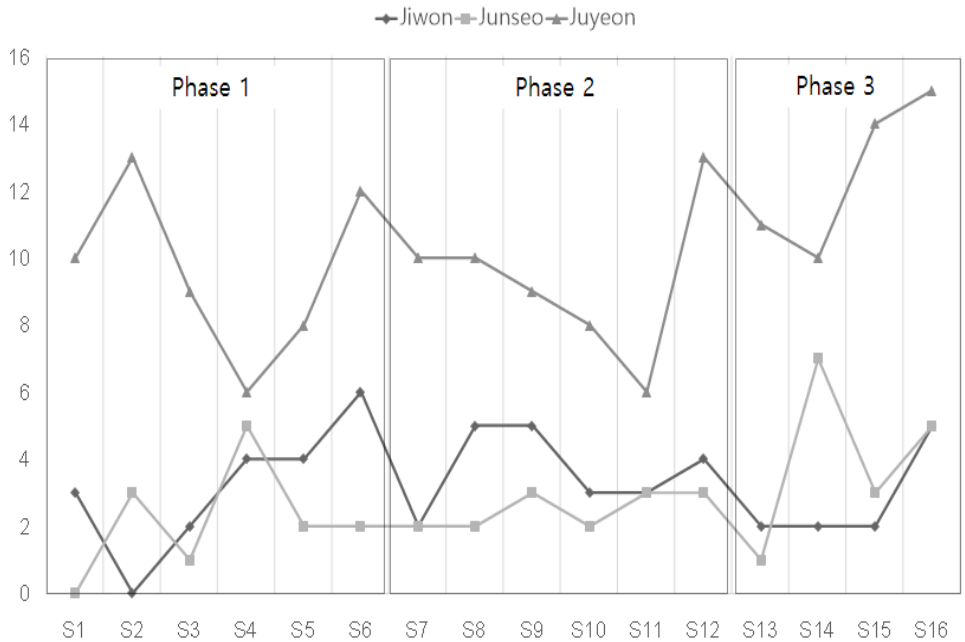


Table 4.6

Frequency of the Voluntary Use of the Hyperlinked Online Resources in the Three Phases

	Phase 1			**Phase 2**			**Phase 3**		
	Frequency	Mean	*SD*	Frequency	Mean	*SD*	Frequency	Mean	*SD*
Jiwon	13	2	1.8	18	4	1.2	19	4	1.2
Junseo	13	2	1.5	12	2	0.4	19	4	2.0
Juyeon	58	10	2.3	43	9	1.4	63	13	1.8

*Phase 1: S1–S6, Phase2: S7–S11, Phase 3: S12–S16

As shown in Table 4.6, there was a slight increase in the frequency of the three participants' voluntary use of hyperlinked online resources, although there was a less significant variance in Jiwon's voluntary use of the hyperlinked online resources within Phase 2 ($M = 4$, $SD = 1.2$) and Phase 3 ($M = 4$, $SD = 1.2$). It was observed that Jiwon used the hyperlinked online resources voluntarily when there was insufficient or no information in the text or hyperlinked online resources were provided that resolved her curiosity while reading. Table 4.7 shows Jiwon's use of pre-determined hyperlinked online resources and how it led to the voluntary use of hyperlinked online resources to solve her curiosity. For example, Jiwon clicked the hyperlink "*pill-bug*" linked with NED at first, but she was curious what a "*pill-bug*" looked like. Therefore, she voluntarily searched for "*pill-bug*" on YouTube and chose an

English video that she thought was the most relevant to her questions by looking at the title of the video and a short explanation.

She explained in her interview that when she chose the video, language did not seem to interfere with her choice, because she knew that she could use the subtitles on YouTube, as she had learned from orientation. She also believed that she could understand some keywords or key sentences using her lexical knowledge. However, in Session 4, the English video she chose did not provide Korean subtitles. Therefore, she used an English subtitle instead. Excerpt 4.10 illustrates her thoughts on using hyperlinked online resources. In search of the exact information that she needed, Jiwon developed strategies for locating information effectively throughout the 16 online reading sessions. According to the final interview, in Excerpt 4.11, she emphasized that she could learn the distinctive characteristics of each online resource (e.g., NED, NE, YouTube) based on hands-on experience in locating information.

Table 4.7

Example of Jiwon's Voluntary Use of Hyperlinked Online Resource in Session 4

Session 4	
Type of use	Pre-determined hyperlinked online resource
Resource	NED
Query term	*Pill-bug*
Query results	쥐며느리
Evaluation of the result	"What is 쥐며느리? I have never seen this kind of word before. Maybe I should find a vivid image of 쥐며느리."
Type of use	Voluntary use of hyperlinked online resource
Resource	YouTube
Query term	*Pill-bug*
Query result	English video that showed the various characteristics of pill-bug
Observed strategy	Turn on the subtitle (There was no Korean subtitle, so she used English subtitles instead.)
Evaluation of the result	"Wow. Pill-bugs look like roly-poly candy when they crawl. This is interesting. I think I have seen them in my backyard before. Now I understand what they mean."

Excerpt 4.10 I clicked the meaning of "pill-bug" linked with NED at first, but I could not understand what the word exactly meant. I guessed it was one kind of an insect but I

had never seen or heard of pill-bugs before. So, I searched for “pill-bug” on YouTube voluntarily, because YouTube could provide me with a lot of moving images and interesting ideas to learn from watching. Though the video I chose did not provide me with Korean subtitles, I could still understand what the video tried to convey by matching vivid images with the key English words presented in the subtitle. It was interesting to watch the pill-bug crawling slowly, which helped me understand what pill-bugs look like and how they move. (Quote from the semi-structured interview from Session 4)

Excerpt 4.11 At first I was not quite used to using NE because I have rarely used NE before, but as I get to know the characteristics of these websites and solve my curiosity through NE I learned that it is useful to use NE when I want to search for text-type information in detail. When I wanted to search for vivid images and videos including animation, news, and movies, I could use YouTube for the appropriate information. Now I can select the appropriate resources to solve my needs when reading. (Quote from Jiwon’s final interview)

Like Jiwon, Juyeon also showed a development in her strategy of locating information with the voluntary use of hyperlinked online resources throughout the reading sessions. As seen in Table 4.3 above, Juyeon showed an increase in the frequency of the voluntary use of hyperlinked online resources in Phase 3 ($M = 9$, $SD = 1.4$) compared to Phase 2 ($M = 13$, $SD = 1.8$). However, at first, she was not quite used to searching for the exact information to answer

questions or satisfy curiosity that arose during reading. At the beginning session of Phase 1, while reading, Juyeon frequently showed dissatisfaction with her search results, which resulted in no further use of hyperlinked online resources. However, as seen in Excerpt 4.12, as she gained experience in using hyperlinked online resources, she could utilize the strategy of "narrowing down the query" to locate information easily, which led her to use different types of hypertext materials more frequently and easily as she needed. Moreover, it was found that it took about 27 minutes for Juyeon to finish her reading when assisted by hyperlinked online resources in Phase 1, but her reading time showed a slight decrease in Phases 2 and 3 to 24 to 25 minutes, though the length and the level of the texts in each task were similar.

As her skills in locating information develop, her satisfaction with the query results increased, which corroborates findings that students are likely to develop strategies for using hyperlinked online resources through continuous exposure to hypertext-assisted environments (Coiro & Dobler, 2007; Walkowiak et al., 2015). Her process of locating information is presented in Table 4.8. Though Juyeon was a relatively low-level reader, she tried to complement her deficiency in English reading by utilizing various hyperlinked online resources and strategies in the online reading process. Excerpt 4.12 shows how Juyeon's practices changed through the use of hyperlinked online resources in the English reading process.

Table 4.8

Example of Juyeon's Voluntary Use of Hyperlinked Online Resource in Session 7

Session 7	
Type of use	Voluntary use of hyperlinked online resource
Resource	NE
Query term	*나비의 과정*
Query result	함평나비 대축제, 나비효과, 나비춤, 호랑나비
Evaluation of the result	"Why is there no such information about the change of the butterfly? I have to change the query to be more specific."
Observed strategy	Narrow down the query
Type of use	Voluntary use of hyperlinked online resource
Resource	NE
Query term	*나비의 성장과정*
Query result	
Observed strategy	Seeks diagrams, movies, pictures, and charts to help him/her understand the text
Evaluation of the result	"This is the exact information that I wanted. I wanted to see the process in images and videos. Now I can understand the text more easily."

> Excerpt 4.12 When the result did not show me the exact information that I wanted, I thought that I had better narrow down the query specifically to find the information because in previous reading sessions, I could not find the information that I wanted at first, but when I changed the words to a more specific query it gave me closer information. So, I looked at my query and felt that it seemed a little bit extensive for the NE to search. Therefore, I narrowed down the query and it gave me the exact information that I wanted. (Quote from Juyeon's semi-structured interview in Session 7).

> Excerpt 4.13 As I went through several sessions of English reading assisted by hyperlinked online resources, I felt much more comfortable finding the exact information I was curious about. The result helped me understand the sentence easily. It made me feel confident in reading English texts. (Quote from Juyeon's final interview)

Junseo's voluntary use of hyperlinked online resources was similar to the use of pre-determined hyperlinked online resources. Junseo thought that the use of hyperlinked online resources made his knowledge "robust." He had an intense motivation to learn from reading. Therefore, his use of hyperlinked online resources was directed at finding out what he already knew from his prior experience and what was new to him. He actively used the information he learned from hyperlinked online resources. As seen in Excerpt 4.12, after he looked up "*Bears' hibernation*" in NE, he could figure out the word's meaning within the context and comprehend the text accurately.

> Excerpt 4.11 Though I was quite familiar with the topic "Autumn," there might be some information that was new to me, so I had to watch the video without skipping it. (Quote from Junseo's semi-structured interview in Session 10)

> Excerpt 4.12 When I was reading, I faced the word "fill up on food," which I could not decide whether it meant the bears fill up on food on their stomach or outside of the cave. Therefore, I searched for "*Bears' hibernation*" and figured out that it is appropriate to understand "fill up on food" as the bears' storage of food in their stomach. And reading the explanation as a whole in the encyclopedia helped me better understand the given L2 text. (Quote from Junseo's semi-structured interview in Session 13)

Among the voluntary use of various online resources in English reading, the most frequently used hyperlinked online resource by readers was NED. However, the purpose for using NED differed for each participant according to their lexical knowledge. As Jiwon had a higher level of English proficiency than the other participants, she used NED mainly to confirm the meanings of uncertain words, search for the refined meaning of a phrase or sentence with a translation function, "Papago," and search for other appropriate meanings of a word that better fit the given context, as seen in Table 4.9.

Table 4.9 The Purpose of Jiwon's Voluntary Use of the Online Dictionary

Purpose of the use	Frequency
Total queries of NED	41
1. Search for the refined meaning of a phrase or sentence with a translation function (Papago)	19
2. Search for another appropriate meaning of a word that fits the given context	10
3. Search for the meaning of an unknown word or a string of unknown words or phrases	8
4. Confirm the meanings of uncertain words or phrases	4
5. Listen to and repeat the pronunciation of words or phrases	6
6. Etc. (e.g., adjust the size or location of pop-up windows)	3

What was notable in the use of NED was the use of the translation function "Papago" in NED. As seen in Table 4.10 and Excerpt 4.13, Jiwon translated the sentence by herself at first, but she was not satisfied with the results of her own translation. Therefore, she used Papago to search for the appropriate meanings of phrases and to refine her translation of sentences. This corroborates the finding of Kim (2018) that the reason for using a translation function to refine a translation was considered one of the characteristics of a proficient learner.

Table 4.10

Example of Jiwon's Voluntary Use of Hyperlinked Online Resource in Session 1

Session 1	
Problematic sentence	Can you name them all?
Reaction	그것들의 이름을 말할 수 있나요? Am I right? I don't like the translation made by myself. Maybe I should search the NED.
Type of use	Voluntary use of hyperlinked online resource
Resource	NED
Query term	*Can you name them all*?
Query results	Can: 할 수 있다, name: 이름, word:단어
Evaluation of the result	"It does not translate the sentence as I wanted. It only gives the word segment of the sentence. Maybe I would rather use the translation function 'Papago' for a better translation. "
Observed strategy	Use Papago translation function
Query term	*Can you name them all?*
Query results	모두 말씀해 주시겠어요?
Evaluation of the result	"Hmm…So it means 모두 말씀할 수 있나요? or 모두 말할 수 있나요? Ok, Now I get the comprehensive meaning of it."

> Excerpt 4.13 I already knew the literal meanings of the words presented in the text, but I did not like the way I translated them. I wanted to translate them in a more natural way that would fit into the context. Therefore, I used Papago for the refined meaning of the sentence. Thanks to Papago, I could learn many different meanings of words and how the word is translated depending on the context. (Quote from Jiwon's online reading task in Session 1)

Juyeon also frequently used the translation function (Papago) in NED, which occupied 80 percent of her voluntary use of hyperlinked online resources. However, the main purpose of her use of Papago in NED was slightly different from Jiwon's. As Juyeon had less proficient linguistic skills in English than Jiwon and Junseo, her main difficulty in reading was lexical problems. During reading, Juyeon repeatedly asked herself, "Am I right?" or "Is this meaning correct?" As seen Excerpt 4.14 below, she indicated that her lack of linguistic proficiency led her to doubt her translation of the text, which spurred her to use the translation function in NED to search for unknown phrases and sentences and confirm the meanings of problematic words or phrases.

> Excerpt 4.14 As I was not good at English, I was not sure of my translation whenever I read English texts. Therefore, I looked words up NED to make sure I was correct. When I had a problem with a sentence, I used Papago in NED because it helped me figure out the appropriate meaning easily. It also made me feel relieved and confident if some of the meanings of the sentences were similar to what I initially thought. (Excerpt from Juyeon's semi-structured interview in Session 13)

Table 4.11 The Purpose of Juyeon's Voluntary Use of the Online Dictionary

Purpose of the use	Frequency
Total queries of NED	150
1. Search for meaning of a phrase or sentence with a translation function (Papago)	132
2. Read the Korean pronunciations of the English words, phrases, or sentences in translation function (Papago)	43
3. Listen to and repeat the pronunciations of words or phrases	33
4. Search for the meaning of an unknown word or a string of unknown words or phrases	13
5. Search for other appropriate meaning of a word that goes well with the given context	3
6. Etc. (e.g., Click the example sentences, adjust the size or location of pop-up windows, search for other function in the website)	30

Juyeon's use of the translation function seemed to complement her deficit of alphabet knowledge. For example, she could read the letters and understand some simple words, but she often confused lower-case L with upper-case I and

thus sometimes typed “It” as “lt” in the query. Though she typed the wrong letters in the query, the translation function in NED provided the correct meaning of the problematic sentence regardless. As seen in Tables 4.12 and 4.13, the translation function in NED conveyed the appropriate meaning of the problematic sentence, which helped Juyeon understand the text easily.

Table 4.12

Example of Juyeon’s Voluntary Use of Hyperlinked Online Resource in Session 1

Session 1	
Resource	Translation function in NED
Query term	*It can be counted in days, months, and years.*
Query results	이것은 월과 년 단위로 셀 수 있습니다.
Observed behaviors	Type the small letter l, instead of the big letter I (*lt can be counted in days, months, and years.) Read the translation
Evaluation of the result	“이것은 월과 년 단위로 셀 수 있습니다. All right. Now I understand the meaning of this sentence.”

Table 4.13

Example of Juyeon's Voluntary Use of Hyperlinked Online Resource in Session 13

Session 13	
Resource	Translation function in NED
Query term	*Choosing to walk or bike helps to keep the air clean.*
Query results	걷거나 자전거를 타는 것을 선택하는 것은 공기를 깨끗하게 유지하는데 도움이 된다.
Observed behaviors	Type the big letter I, instead of the small letter l (Choosing to walk or bike *heIps to keep the air clean) Read the translation
Evaluation of the result	"Ok. I understand what it means. That's why I walk to school every day to keep the air clean."

Excerpt 4.15 I did not notice that I wrote lower-case l instead of upper-case I. I knew what each letter looked like, and I remembered that the researcher told me that the small letter "l" did not come together with "t" at the beginning of the word without vowels, but when I looked at the letter without thinking, it unconsciously slipped my mind. I thought that the meaning provided by the Papago was comprehensible to me, so that was why I did not check the error of my query and moved on to the next sentence instead. To improve my

> English proficiency, I think I need to get continuous feedback from the teacher after the reading session. (Quote from Juyeon's semi-structured interview in Session 13)

Juyeon could distinguish capital *I* from lower-case *l*. However, errors crept in when she typed the sentence into Papago without paying attention. Based on her interview in Excerpt 4.15, it can be inferred that the translation function in NED solves the lexical problems of low-level readers by providing the appropriate meaning of the sentence. However, the use of the translation function might not ensure the correction of low-level reader's errors, which should be better utilized under corrective feedback from the teacher. With the subsequent feedback from the researcher, Juyeon succeeded in not producing any errors in the final session of her reading.

As for Junseo, he particularly used hyperlinked online resources extensively in Phase 3, which resulted in a relatively remarkable variance (M = 4, SD = 2.0) compared to Phase 2 (M = 2, SD = 0.4). In the specific text on the topic of "Propagation of seeds" in Session 14, his voluntary use of hyperlinked online resources was 40 percent higher than the average voluntary use of hyperlinked online resources in Phase 3. The use of NED in his voluntary use of hyperlinked online resources in Session 14 made up 70 percent of all such uses. According to his search process in Table 4.14, Junseo

had difficulty comprehending the sentence, which did not seem appropriate from his background knowledge.

Table 4.14

Example of Junseo's Voluntary Use of Hyperlinked Online Resource in Session 14

Session 14	
Problematic sentence	Wear old socks over your shoes.
Type of use	Voluntary use of hyperlinked online resource
Resource	NED
Query term	*over*
Query result	넘어지게, 뒤집어, 위에
Evaluation of the result	"Why do I have to wear old socks over my shoes? Aren't the socks supposed to be worn inside the shoes? It is hard to choose one appropriate meaning of the word *over*. If I cannot choose the appropriate meaning of *over* in this sentence, maybe '*your*' might have another meaning to help me get over the difficulty"
Observed strategy	Search for another word in the sentence
Type of use	Voluntary use of hyperlinked online resource
Resource	NED
Query term	*your*
Query result	너의

Evaluation of the result	"I already knew what *your* meant in Korean. Though it does not make sense with my background knowledge, I think '오래된 양말을 너의 신발 위에 신어라' is the best translation I could make."

> Excerpt 4.16 The sentences in this reading session such as "Wear old socks over your shoes" or "Wet the socks," made me confused and unable to comprehend the meaning of the sentence. Judging from my background knowledge, it is unnatural to wear socks around the shoes. We wear socks inside the shoes, not the outside. It made it difficult for me to translate the sentence. I doubted my translation and searched on the word again and again. I even searched for the word "*your*" in the sentence, because I suspected there might be some other meaning I did not know that would work as a clue to translate the sentence acceptably for my background knowledge. (Quote from Junseo's semi-structured interview in Session 13)

Junseo's use of NED was different from that of Juyeon and Jiwon. As seen from Table 4.15, what was notable in Junseo's voluntary use of NED was that he never used the translation function Papago in his reading. He argued that using the translation function would impair his English proficiency because Papago could translate every sentence written in English instead of him. He was also worried that he might come to depend on the Papago if he started using the function in his English reading. He even illustrated the translation

function as “looking up on the answer sheet while solving the problems” in Excerpt 4.17. It could be inferred that reading was a problem-solving activity for Junseo and that translation occupied a great amount of importance in his reading, whereby he considered using the translation function (Papago) an unnatural shortcut to reading comprehension that was undeserved.

Table 4.15 The Purpose of Junseo’s Voluntary Use of Online Dictionary

Purpose of the use	Frequency
Total queries of NED	40
1. Search for the meaning of an unknown word or a string of unknown words or phrases	30
2. Search for other appropriate meaning of a word that goes well with the given context	10
3. Listen to and repeat the pronunciation of words or phrases	9
4. Etc. (e.g., adjust the size or location of pop-up windows)	2

> Excerpt 4.17 I usually used NED when I had words I did not know, but I never used Papago because it felt like cheating to me. For example, when I typed difficult words or sentences, Papago would give me an answer in a second. It seemed like looking up on an answer sheet to me. (Quote from the semi-structured interview from Session 2)

Junseo effectively used NED in resolving word-level difficulties. However, when he encountered phrase-to-sentence level difficulties, NED did not help him solve the lexical problems satisfactorily. For instance, when he encountered sentences such as "*Dams hold back and release water*" (Session 9), he had difficulty translating the text. He divided the collocation into "hold" and "back," which means "잡다" for *hold* and "뒤로," "척추," "과거" for *back*. Though "*hold back*" means "to stop or hold something from doing," Junseo translated the sentence as "뒤로 잡아서 내보낸다."

Though the use of NED differed for each participant according to their English proficiency, Jiwon, Juyeon, and Junseo effectively used NED to resolve their word-level, phrase-level, and sentence-level difficulties in online English reading. When NED failed to solve their problems, the participants searched for other hyperlinked online resources (e.g., NE, YouTube) hoping to get more content knowledge to understand the text or to get vivid images from the online resources that could help them comprehend the meaning of the problematic sentence. Moreover, constantly undertaking the searching process helped the readers develop effective locating strategies to solve their problems in online English reading, leading them to complete their English reading successfully and helping them feel self-efficacy and interested in reading English texts, which will be discussed in depth in the following section.

4.1.3 Readers' Perceptions of Hyperlinked Online Resource Use in English Reading

The three participants' perception of using hyperlinked online resources in L2 reading was explored in depth through semi-structured interviews and final interviews. In each interview, Jiwon, Junseo, and Juyeon expressed their thoughts and feelings about the use of each hyperlinked online resources (e.g., NED, NE, and YouTube) and the advantages and disadvantages of each.

The readers' overall evaluation of the online resources was positive. They believed that using hyperlinked online resources while reading English helped them feel confident in reading. It also enabled readers to become interested in English reading. Among the three online resources (e.g., NED, NE, YouTube), the readers evaluated NED as the most helpful tool because lexical problems were the most frequent problems they encountered in their English reading.

As seen from the readers' final interview in the excerpts below, readers felt confident in reading because they could complete the English reading with the use of NED. For example, in Excerpt 4.18, Jiwon accentuated the usefulness of the translation function in NED regarding the natural translation of sentences within the context. As Jiwon had a higher level of English

proficiency than the others, her use of NED was extended from understanding the literal meaning of unknown words or phrases.

> Excerpt 4.18 The most difficult thing in English reading was scientific words. Therefore, when I had word problems in reading, I usually guessed first and then tried to figure out what it meant. However, if I still could not figure out the meaning, I used NED. It gave me quick results. Moreover, when I had problems with sentences, I used Papago in NED. I usually felt stressed out when the translation I made by myself did not feel natural. However, thanks to the Papago, I could translate the sentence more naturally to fit the context. This made me enjoy English reading a lot more than before. (Quote from Jiwon's final interview)

Next, Junseo indicated that his vocabulary knowledge seemed to have improved from his early reading sessions. For example, he remembered the words "hold," "breathe," "predator," and "rain forest," which he frequently searched for in NED during the online English reading tasks. He added that he remembered the meanings of these words and could comprehend the other English texts besides those used in this study, such as hak-won English assignments. As seen in Excerpt 4.19, when he encountered the word, he could retrieve the meaning and use the word to comprehend the text, which gave him confidence and excitement in his English learning.

> Excerpt 4.19 I encountered some words that I had learned from these reading tasks assisted by hyperlinked online resources in my hak-won assignments. I was doing reading

> assignments and found very familiar words such as “breathe,” “predator,” or “rainforest” that I had typed in as queries in NED. I think that the words that I searched for in NED several times helped me remember the meanings of words well. It enabled me to comprehend the text by myself and I felt more confident in reading English texts. (Quote from Junseo’s final interview, Session 16)

Juyeon was a relatively low-level reader and her dependence on the translation function was profound. Juyeon preferred to type the sentence that contained the problematic word as a whole because she found it difficult to choose the appropriate meaning in the sentence by herself because of her lack of linguistic knowledge. She indicated that thanks to the use of the translation function in NED, she could finish reading English texts and felt confident reading in English.

> Excerpt 4.20 Because each word had more than one meaning, I had to choose the appropriate meaning of a word from NED that went well with the sentence. But it was difficult for me to choose the appropriate meaning because of my lack of English proficiency. Therefore, I used the translation function, Papago in NED, because it provided me with the appropriate meaning of words if I typed the sentence including the words. It gave me confidence in reading and helped me complete the English reading online instead of being overwhelmed by reading in English. (Quote from Juyeon’s final interview)

The three participants also evaluated the different types of hypertext materials in terms of interest. They evaluated YouTube as the most interesting hypertext material, followed by NE and NED. As seen in Excerpt 4.21, Jiwon evaluated YouTube above three other online resources as the most interesting hyperlinked online resource. She preferred to use YouTube to search for vivid images or active movements of subjects.

> Excerpt 4.21 I prefer to use YouTube the most when I choose the most interesting hypertext materials among the three hyperlinked online resources, because it enables me to understand the scientific concept in vivid images. Also, I like to search for the active movements of the subjects through YouTube. (Quote from Jiwon's final interview in Session 16)

Like Jiwon, Junseo also enjoyed using YouTube in his online English reading. At first, he was quite nervous about watching YouTube in English, but he used the subtitle functions that he learned from the orientation session to aid his understanding. He also effectively used his strategy of figuring out the keywords of the content and matching the words with the images. He indicated his interest in watching the content on YouTube. He explained that using YouTube in his online reading helped him obtain additional background knowledge to understand the text more easily and made him more interested in English reading.

> Excerpt 4.22 At first, I did not enjoy studying English that much. I almost had no experience with watching videos in English except for movies. But when I watched the English video in this reading session, I could understand the keywords and key sentences, because some difficult words or sentences were provided with subtitles and vivid images. Also, as the keywords were said repeatedly by the narrator, I could find out what the keywords were in the video. Watching YouTube in English was not as hard as I expected but rather interesting, because it made my background knowledge robust and helped me understand scientific texts more easily. Now I kind of like studying English. (Quote from Junseo's semi-structured interview in Session 11)

In addition to the interest in reading assisted by hypertext materials, Juyeon accentuated the large amounts of diverse information on YouTube as its greatest advantage in the following Excerpt 4.23. She experienced that there was some information that she failed to find by searching on NE, but succeeded in finding on YouTube.

> Excerpt 4.23 When I was unsatisfied with the result given by NED, I searched on NE and then YouTube, because there was some information that was not presented in NE. But YouTube had a large amount of information that I need. Also, the information provided by the narrator was easier to understand than reading the text materials. (Quote from Juyeon's final interview in Session 16)

In terms of the effectiveness of the search and gain information, students evaluated NE as useful when they wanted to search for exact information fast. Students demonstrated the effectiveness of such time-saving acts in their interviews. As seen from Excerpt 4.24, it was difficult for the reader to figure out where the exact information was located unless they watched the video as a whole. Jiwon also added that she felt it was much easier to find information in NE because she could scroll through the text in NE first and decide the order in which to read the text according to the importance of the information. Moreover, when the readers watched YouTube to the end, it sometimes led them to forget the point in the text where they were reading, which can be explained by the "disorientation" problem in online reading as seen from Excerpts 4.25 and 4.26. As Juyeon mentioned in Excerpt 4.26, disorientation during the use of hyperlinked online resources was likely to occur when they are not paying attention to their searching process. It can be inferred that the use of a monitoring strategy could help them stay focused on their search process in the dynamic online environment (Shin et al., 1994; Wu et al., 2020).

> Excerpt 4.24 When I used YouTube, there was some missing information if I skipped some parts of the video. I had to rewind again and again to find the missing information, which was quite uncomfortable compared to NE. However, NE provided as much information as YouTube and I could decide the order of reading by scrolling first. (Quote from Jiwon's semi-structured interview from Session 13)

> Excerpt 4.25 Watching YouTube sometimes took me a lot of time to finish watching until I found the exact information that I needed. However, when reading the content from NE, I could scan the whole text fast and find the right information that I wanted, which I think is effective. (Quote from Junseo's semi-structured interview from Session 10)

> Excerpt 4.26 NE is effective when I want to find the information fast because I can scroll down the text in NE fast and find the key sentence and its supporting ideas to get the gist of it. When I watched YouTube, I sometimes forgot where I was reading, when it took a long time to watch and I came back to reading; I had to keep aware of where I was reading and what the narrator was saying. (Quote from Juyeon's final interview)

Differences in the presentation of information seemed to influence students' perception of hyperlinked online resources and the strategies they used to reach comprehension. Aside from the strengths mentioned by the readers, the participants also suggested some improvements that need to be made in these hypertext materials. For example, in the use of NED, they mentioned some limitations in "translation function."

When Jiwon searched for the sentence "*We can all work together*," what she wanted was a more metaphorical and natural translation. However, Papago provided a literal meaning that did not take into account the whole

atmosphere of the text, as shown in Excerpt 4.27.

> Excerpt 4.27 When I saw the sentence “We can all work together,” I could translate the literal meaning of the sentence as “우리는 다 같이 일할 수 있습니다.” However, it felt so strict and stubborn to me, because the whole text was about how we could protect ourselves from Coronavirus. Therefore, I expected a more emotional, narrative, and metaphorical translation, but Papago could not provide me with a satisfactory translation. (Quote from the semi-structured interview in Session11)

Despite the drawbacks the participants mentioned, they felt that using hyperlinked online resources in English reading was helpful enough to compensate for the weaknesses. The use of different online resources helped them to solve problems caused by their lack of lexical knowledge or background knowledge during the reading and led them to feel confident and interested in reading. The readers also added that they felt self-efficacy from completing the English reading with the aid of hyperlinked online resources.

4.2 The Potentials of English Reading Assisted by Hyperlinked Online Resources

4.2.1 The Positive Influence of Hyperlinked Online Resources on EFL Readers' Cognitive and Affective Domain

The potential of English reading assisted by hyperlinked online resources can be considered along two main dimensions: the cognitive and affective domains. As seen in the previous section, participants not only used online resources to solve their lexical problems while reading, but also to build up their content knowledge and fulfill their interest in reading. In this study, readers gained the identity of an "active problem solver" through reading assisted by hyperlinked online resources.

Moreover, the participants developed their cognitive strategy of locating the appropriate information based on their needs. To locate the information, the participants went through three steps: (1) evaluating the online resources, (2) selecting the online resources, and (3) choosing the appropriate query word to search for the information. If the result was provided, the participants went through the evaluation process again to decide if the information was what they needed. This type of strategy of "evaluation" or "narrowing down the query word" is considered crucial in the new form of literacy, "digital literacy" (Lankshear & Knobel, 2003).

Regarding the affective domains of reading, self-confidence and self-efficacy came with the reading interest. As the affective factors were closely related to each other and were experienced at the same time, the participants developed self-confidence in reading that led to their acquisition of self-efficacy. Based on the background information interviews with readers, Juyeon and Junseo were not used to reading English texts either online or offline. Therefore, when they first read English texts online, they found it uncomfortable and difficult to comprehend. However, as seen in the Excerpts below, with the assistance of hyperlinked online resources, the participants could figure out what the English words, phrases, and sentences meant by guessing and predicting. In other words, they were able to test their hypotheses about the unknown words or phrases. If students guessed the meaning of the word correctly, they felt proud of themselves, which can be explained by "self-efficacy." As shown in Excerpt 4.30, Jiwon felt self-efficacy in reading when she could convey the meaning of sentences more properly and naturally with the help of NED.

> Excerpt 4.28 When I encountered the unknown word or phrase, I guessed the meaning first. I tried to remember if I had seen this word before and I looked for the cues in the sentence which could help me guess the meaning of unknown word. After that, I clicked the NED to check if I guessed it correct. If the guessed meaning is correct, I feel so happy and proud of myself. (Quote from Junseo's final interview)

> Excerpt 4.29 Because I am not good at English, it is difficult to translate the whole English sentence by myself. Therefore, I looked for the familiar words I knew in the sentence. Then I guessed the meaning of the sentence with the words I knew. After that I checked the meaning of the sentence with the translation function in NED. When I nearly guessed the meaning correct, I became confident and motivated to continue reading the English text. It also made me feel more interested in reading the English text. (Quote from Juyeon's final interview)

> Excerpt 4.30 I felt confident and proud of myself when I translated the English sentence into more refined Korean sentence by myself. I think that the use of NED helped me to learn diverse meanings of English words that I could use in the proper context. (Quote from Jiwon's final interview)

It can be inferred that the positive feelings readers experienced in reading facilitated their active use of hypertext materials, which in turn elicited interest in reading. The primary goal of the use of hypertext materials in L2 online reading is to make the reader an "autonomous learner" and a "problem-solver," which is illustrated by the use of hyperlinked online resources and the observed cognitive strategies of participants in this study.

4.2.2 The Value of Reading Experience and Practice

Hypertext reading is a dynamic reading that provides students with various options to choose from while reading. These options are operated with a hyperlink structure that is activated by the click of the mouse. Though the participants had already been exposed to diverse online resources before the study, the use of hyperlinked online resources as problem-solving tools for their English reading was not familiar to them. The participants stated that they had to explore the feature of hyperlinked online resources in the first phase of sessions to get used to this reading environment.

Hence, it can be inferred that regardless of the readers' experience in using online resources, using online resources effectively to solve their problems in reading is another matter.

According to previous research, readers' experiences with online resources impact their reading comprehension (Brinkerhoff et al., 2001; Walkowiak et al., 2015). Therefore, hands-on experience with the use of online resources as a problem-solving tool in their English reading should be continuously provided. In this study, the three participants developed strategies for locating information effectively depending on their English proficiency or content knowledge. They were observed to use online resources differently according to their diverse needs in reading, such as learning content knowledge,

solving lexical problems, and searching for interesting content. Such uses of online resources changed their attitudes toward reading English positively.

However, there were some problems observed in reading that could not be satisfactorily solved with hyperlinked online resources. For example, Jiwon found that searching for a metaphorical translation extended from the literal meaning of the sentence did not work satisfactorily for her in the NED. Juyeon also had difficulty in her use of the alphabet when querying the translation function in NED, which required corrective feedback from the researcher. Therefore, the use of online resources as a problem-solving tool for English can operate more effectively with the aid of teachers or more adept peers, which might be suggested for examination in further studies.

Although there were some weaknesses in the use of online resources in English reading, students indicated in their interviews that the strengths of the use of hyperlinked online resources in English reading could compensate for the weaknesses. Students tended to develop their cognitive strategies for using hyperlinked online resources effectively with the continuous use of hyperlinked online resources in their reading. What was notable in their use of online resources was the monitoring strategy that readers developed to maintain their concentration and awareness of their search goals and the reading processes. As the online resources contained various links to follow,

readers might feel cognitive burden in choosing or they might lose sight of their reading goal and follow the instinct to entertain themselves, which results in disorientation while reading. However, as observed for these participants, monitoring their search process helped them find errors in their query and figure out the main ideas while reading long texts or watching long videos in their use of online resources. Therefore, hands-on experience in using online resources with a careful monitoring strategy seemed to play an important role in the dynamic computer-based reading environment.

CHAPTER 5

CONCLUSION

This chapter summarizes the major findings of this study and the implications of the findings in Section 5.1. Section 5.2 then outlines the limitations of the study and offers suggestions for further research.

5.1 Major Findings and Implications

The major goal of this study was to explore the reading process of Korean EFL elementary school students when assisted by hyperlinked online resources and the potential of the hyperlinked online resources to serve as supportive and helpful tools for their second language learning. It aimed to make learners feel interested in reading English and change them into "autonomous readers." Therefore, it was important to investigate the readers' use of hyperlinked resources in reading and how they perceived the use of hyperlinked online resources throughout the English reading process.

Three Korean elementary school students participated in this study. To

explore young readers' use and perception of the different types of online resources in English reading, a triangulated approach to data collection was adopted that applied diverse instruments such as English reading text embedded with hyperlinked online resources, semi-structured interviews, and final interviews.

The major finding of this study was that the reader's accumulated experience in using the hyperlinked online resources elicited the effective use of these resources. Though the individual reader's purpose of the use of online resources was slightly different according to their English proficiency, content knowledge, and interest, readers' continued use of hyperlinked resources as problem-solving tools paved the way for each reader to develop an online reading strategy. They effectively utilized strategies to locate information, evaluate the information sources, and monitor what they read throughout the English reading process. These strategic behaviors led them to acquire lexical knowledge and content knowledge effectively and to experience an attitudinal change toward English reading.

Though participants had prior knowledge of the provided hyperlinked resources (e.g., NED, NE, YouTube), they struggled to use these resources to search for the exact information needed. They showed dissatisfaction with their query results and felt difficulty in English reading at the beginning. However,

throughout the 16 reading sessions, students came to use the online resources effectively based on their lexical needs, which enabled them to acquire linguistic knowledge or feel more motivated to learn English than before, which corroborates earlier findings that readers' experiences with the use of online resources as problem-solving tools are crucial to reading comprehension (Lowerison et al., 2006; Walkowiak et al., 2015). Moreover, with the assistance of hyperlinked online resources, readers could develop self-confidence in English reading, which resulted in enhancing their self-efficacy and reading interest. In the final interviews, the participants defined hyperlinked online resources as an "indispensable tool" in their English reading.

Therefore, this study suggests that it is important to provide students with hands-on experience regarding the use of the different types of online resources in order to teach them to use online resources effectively to support their reading. It is also suggested that feedback or guidance be provided on the results of young readers' use of online resources. Regardless of the characteristics of their respective lexical knowledge or content knowledge, the readers developed their own strategies for using hyperlinked online resources effectively when they were provided with proper feedback or guidance in using the tool.

In addition, readers' self-regulatory strategies in hypertext reading such as monitoring their use of hyperlinked online resources and reading processes were crucial to their effective hypertext reading. With the use of self-regulatory strategies, readers could focus on their goal instead of being attracted to unrelated information or becoming disoriented in their reading process. They could utilize online resources as helpful cognitive tools to support their reading. According to Jonassen and Reeves (1996), "Cognitive tools enable mindful, challenging learning, rather than effortless learning" (p. 698). As the online reading environment is interconnected with diverse hyperlinks, it is important for readers to stay aware of their reading process and continuously monitor their own search process (Azevedo, 2005). Therefore, the appropriate use of monitoring strategy in online reading with young readers would facilitate the supportive use of hyperlinked online resources in the dynamic online environment.

5.2 Limitations and Suggestions for Further Research

The present study investigated how three young readers used hyperlinked online resources in English reading and how they perceived the use of hyperlinked online resources during the reading process. The study showed that students used hyperlinked online resources mainly to support their cognitive and affective dimensions in reading, which led the students to

develop their own strategies of reading and changed their attitudes toward English reading. However, this study has the following limitations.

One limitation of this research is intrinsic to qualitative case studies: It involved a small number of participants. To generalize the potential benefits of online resources in the reading process, a large sample of students can be examined in future studies. In addition, further research can quantitatively investigate the contribution of online resources to learners' reading comprehension. A mixed-method approach to examine the development of the reading proficiency of participants would also complement the results regarding readers' linguistic development in depth.

Moreover, this study used hypertext which was artificially designed by the researcher, by embedding hyperlinked online resources with English texts. Though the online resources used in this research were confined to three types of resources, it was designed to provide young readers with safe search tools in consideration of their stage of cognitive and affective development. Therefore, in order not to make young readers exposed to unwanted information which is too aggressive or inappropriate, contents from NED, NE, and YouTube were carefully investigated by the researcher and were hyperlinked with the text.

In addition, this study used English-based website (e.g., YouTube)

along with Korean-based monolingual websites (e.g., NED, NE) which are suggested as appropriate but are relatively lacking in English input. In further study, diverse English-based online resources can be considered to provide readers with a variety of inputs in English. Such diverse uses of English-based online resources would enable researchers to identify online reading strategies that differ from those that readers use in reading Korean-based online resources. It would also provide future researchers with a broader perspective on readers' use of online resources and language development.

Despite the limitations in the instruments of the present study, this study demonstrated significant implications of the use of hyperlinked online resources in English reading for the development of Korean elementary school students' cognitive and affective dimensions. The use of hyperlinked online resources in reading might not take full effect on the young readers' final stage of the reading journey. However, by utilizing various hyperlinked resources while reading, readers could raise awareness of each online resource and evaluate the appropriateness of the information they encountered in the search process. Such uses resulted in solving their reading difficulties effectively and changing their attitude toward reading English positively, which showed the potential benefits of hyperlinked online resources in EFL readers' reading experiences.

REFERENCES

Abdi, R. (2013). The effect of using hypertext materials on reading comprehension ability of EFL learners. *Procedia-Social and Behavioral Sciences, 83*, 557-562.

AbuSeileek, A. F. (2008). Hypermedia annotation presentation: Learners' preferences and effect on EFL reading comprehension and vocabulary acquisition. *CALICO Journal, 25*(2), 260-275.

AbuSeileek, A. F. (2011). Hypermedia annotation presentation: The effect of location and type on the EFL learners' achievement in reading comprehension and vocabulary acquisition. *Computers & Education, 57*(1), 1281-1291.

Ainley, M., Hidi, S., & Berndorff, D. (2002). Interest, learning, and the psychological processes that mediate their relationship. *Journal of Educational Psychology, 94*, 545-561.

Akbulut, Y. (2008). Predictors of foreign language reading comprehension in a hypermedia reading environment. *Journal of Educational Computing Research, 39*(1), 37-50.

Alderson, J. C. (2000). *Assessing reading*. Cambridge University Press.

Anderson, N. (2003). Scrolling, clicking, and reading English: Online reading strategies in a second/foreign language. *The Reading Matrix, 3*(3), 1-33.

Ariew, R., & Ercetin, G. (2004). Exploring the potential of hypermedia annotations for second language reading. *Computer Assisted Language Learning, 17*(2), 237-259.

Azevedo, R. (2005). Using hypermedia as a metacognitive tool for enhancing student learning? The role of self-regulated learning. *Educational Psychologist, 40*(4), 199-209.

Balcytiene, A. (1999). Exploring individual processes of knowledge construction with hypertext. *Instructional Science, 27*(3), 303-328.

Bilal, D. (2002). Children's use of the Yahooligans! web search engine. III. Cognitive and physical behaviors on fully self-generated search tasks. *Journal of the American Society for Information Science and Technology, 53*(13), 1170-1183.

Braasch, J. (2020). Advances in research on internal and external factors that guide adolescents' reading and learning on the Internet. *Journal for the Study of Education and Development, 43*(1), 210-241.

Brinkerhoff, J., Klein, J., & Koroghlanian, C. (2001). Effects of overviews and computer experience on learning from hypertext. *Journal of Educational Computing Research, 25*(4), 427-440.

Burbules, N. C., & Callister, T. A., JR. (2000). *Watch it: The risks and promises of information technologies for education*. Westview Press.

Burin, D., Barreyro, J., Saux, G., & Irrazabal, N. (2015). Navigation and comprehension of digital expository texts: Hypertext structure, previous domain knowledge, and working memory capacity. *Revista Electrónica De Investigación Psicoeducativa Y Psicopedagógica, 13*(3), 529-550.

Cerdán, R., Vidal-Abarca, E., Martínez, T., Gilabert, R., & Gil, L. (2009). Impact of question-answering tasks on search processes and reading comprehension. *Learning and Instruction, 19*(1), 13-27.

Chen, I. J., & Yen, J. C. (2013). Hypertext annotation: Effects of presentation formats and learner proficiency on reading comprehension and vocabulary learning in foreign languages. *Computers & Education, 63*, 416-423.

Chen, L. W. C. (2015). Taiwanese EFL learners' perceived use of online reading strategies. *IAFOR Journal of Education, 3*(2), 68-80.

Cho, B. (2014). Competent adolescent readers' use of internet reading strategies: A think-aloud study. *Cognition and Instruction, 32*(3), 253-289.

Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension

strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly, 42*(2), 214-257.

Coiro, J. (2011). Predicting reading comprehension on the internet. *Journal of Literacy Research, 43*(4), 352-392.

DeStefano, D., & LeFevre, J. (2007). Cognitive load in hypertext reading: A review. *Computers in Human Behavior, 23*(3), 1616-1641.

Fidel, R., Davies, R. K., Douglass, M. H., Holder, J. K., Hopkins, C. J., Kushner, E. J., & Toney, C. D. (1999). A visit to the information mall: Web searching behavior of high school students. *Journal of the American Society for Information Science, 50*(1), 24-37.

Glaser, B. G., & Strauss, A. L. (1999). *The discovery of grounded theory: Strategies for qualitative research*. Aldine.

Goldman, S., Braasch, J., Wiley, J., Graesser, A., & Brodowinska, K. (2012). Comprehending and learning from internet sources: Processing patterns of better and poorer learners. *Reading Research Quarterly, 47*(4), 356-381.

Hamdan, N., Mohamad, M., & Shaharuddin, S. (2017). Hypermedia reading materials: Undergraduate perceptions and features affecting their reading comprehension. *Electronic Journal of E-Learning, 15*(2), 116-125.

Hashemi, S., & Bagheri, M. (2014). Exploring Iranian EFL learners' reading comprehension test performance: The role of knowledge of reading strategies as an internal factor. *Modern Journal of Language Teaching Methods, 4*(4), 112.

Hidi, S. (1990). Interest and its contribution as a mental resource for learning. *Review of Educational Research, 60*, 549-571.

Hidi, S. (2001). Interest, reading, and learning: Theoretical and practical considerations. *Educational Psychology Review, 13*, 191-209.

Holopainen, L., Hoang, N., Koch, A., & Kofler, D. (2020). Latent profile analysis of students' reading development and the relation of cognitive variables to reading profiles. *Annals of Dyslexia, 70*(1), 94-114.

Huh, K. (2012). A study of integrated reading and writing instruction through the use of multimedia. *Multimedia-Assisted Language Learning, 15*(1), 181-209.

Ignacio, M. R., Van, O. H., & Puerta, M. M. (2009). The effects of the number of links and navigation support on cognitive load and learning with hypertext: The mediating role of reading order. *Computers in Human Behavior, 25*(1), 66-75.

Joh, J. (2004). Which prior knowledge?: Relative contribution of prior knowledge components to EFL reading comprehension. *Language Research, 40*(4), 1035-1057.

Jonassen, D. H., & Reeves, T. C. (1996). Learning with technology: Using computers as cognitive tools. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 693-719). Macmillan.

Jose, K. (2021). "Google and me together can read anything." Online reading strategies to develop hypertext comprehension in ESL readers. *The Journal of Language and Linguistic Studies, 17*(2), 896-914.

Kim, H., & Kim, H. (2010). Teaching of reading strategies in primary English through the use of children's literature. *Primary English Education, 16*(3), 85-121.

Kim, M. (2018). *A case study of Korean EFL middle school students' L2 writing assisted by online resources* [Master's thesis, Seoul National University]. S-space. https://dcollection.snu.ac.kr/public_resource/pdf/000000152374_20220927214045.pdf

Korea Press Foundation. (2022). Research of Korean teenagers' using media [Data Set]. http://www.kpf.or.kr/front/mediasTATS/mediaStatsDetail.do

Lankshear, C., & Knobel, M. (2003). *New literacies: Changing knowledge and classroom learning*. Open University Press.

Lau, K. L., & Chan, D. W. (2003). Reading strategy use and motivation among Chinese good and poor readers in Hong Kong. *Journal of Research in Reading, 26*(2), 177-190.

Lawless, K. A., & Kulikowich, J. M. (1996). Understanding hypertext navigation through cluster analysis. *Journal of Educational Computing Research, 14*(4), 385-399.

Lawless, K. A., Mills, R., & Brown, S. (2002). Children's hypertext navigation strategies. *Journal of Research on Technology in Education, 34*(3), 274-284.

Lee, M. J., & Tedder, M. C. (2003). The effects of three different computer texts on readers' recall: Based on working memory capacity. *Computers in Human Behavior, 19*, 767-783.

Lee, M. J., Tedder, M. C., & Xie, G. (2006). Effective computer text design to enhance readers' recall: Text formats, individual working memory capacity and content type. *Journal of Technical Writing and Communication, 36*(1), 57-73.

Lenders, O. (2008). Electronic glossing–is it worth the effort?. *Computer Assisted Language Learning, 21*(5), 457-481.

Leu, D. J. (2000). Literacy and technology: Deictic consequences for literacy education in an information age. In M. L. Kamil, P. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research*. (3rd ed., pp. 743-770). Routledge.

Lomicka, L. (1998). 'To gloss or not to gloss': An investigation of reading comprehension online. *Language Learning & Technology, 1*(2), 41.

Lowerison, G., Sclater, J., Schmid, R., & Abrami, P. (2006). Student perceived effectiveness of computer technology use in post-secondary classrooms. *Computers and Education, 47*(4), 465-489.

McDonald, S., & Stevenson, R. J. (1996). Disorientation in hypertext: The effects of three text structures on navigation performance. *Applied Ergonomics, 27*(1), 61-68.

McNamara, D. S. (2001). Reading both high-coherence and low-coherence texts. *Canadian Journal of Experimental Psychology, 55*(1), 51-62.

McNamara, D. S., Ozuru, Y., & Floyd, R. G. (2011). Comprehension

challenges in the fourth grade: The roles of text cohesion, text genre, and readers' prior knowledge. *International Electronic Journal of Elementary Education, 4*(1), 229-257.

Meza-Fernandez, S., & Sepulveda-Sariego, A. (2017). Representational model on moodle's activity: Learning styles and navigation strategies. *International Journal of Educational Technology in Higher Education, 14*(1), 1-9.

Min, J. (2017). *A case study of Korean adult EFL writers computer-assisted L2 writing focusing on the use of online resources as L2 writing aids.* [Doctoral dissertation, Seoul National University]. S-space. https://s-space.snu.ac.kr/ bitstream /10371/ 129646/1/ 000000142291.pdf

Mokhtari, K., & Sheorey, R. (2002). Measuring ESL students' awareness of reading strategies. *Journal of Developmental Education, 25*(3), 2-10.

Paivio, A. (1990). *Mental representation: A dual-coding approach*. Oxford University Press.

Park, J., & Yang, E. (2003). Effect of hypertext structure and self direction on learning performance. *The Korean Association of Computer Education, 6*(4), 181-193.

Park, S., & Kim, M. (2013). A study of the effects of a reading program using authentic online materials on teaching elementary school students for their reading competence in English. *Primary English Education*, *19*(4), 55-85.

Plass, J. L., Chun, D. M., Mayer, R. E., & Leutner, D. (1998). Supporting visual and verbal learning preferences in a second language multimedia learning environment. *Journal of Educational Psychology, 90*, 25-36

Plass, J. L., Chun, D. M., Mayer, R. E., & Leutner, D. (2003). Cognitive load in reading a foreign language text with multimedia aids and the influence of verbal and spatial abilities. *Computers in Human Behavior, 19*(2), 221-243.

Poole, A. (2008). The relationship of reading proficiency to online strategy use: A study of US college students. *Journal of College Literacy and Learning, 35*, 3-12.

Potelle, H., & Rouet, J. F. (2003). Effects of content representation and

readers' prior knowledge on the comprehension of hypertext. *Human-Computer Studies, 58*, 327-345.

Pressley, M., & Harris, K. R. (2009). Cognitive strategies instruction: From basic research to classroom instruction. *Journal of Education, 189*(1-2), 77-94.

Procailo, L. (2017). *Reading digital texts in L2: Working memory capacity, text mode, and reading condition accounting for differences in processes and products of reading*. [Doctoral dissertation, The Federal University of Santa Catrina]. https://repositorio.ufsc.br/bitstream/handle/123456789/187261/PPGI0106T.pdf?sequence=1&isAllowed=y

Protopsaltis, A., & Bouki, V. (2005). Towards a hypertext reading/comprehension model. *SIGDOC '05: Proceedings of the 23rd annual international conference on design of communication: Documenting and designing for pervasive information*, pp. 159-166. http://doi.acm.org/10.1145/1085313.1085349

Ramezanali, N., Uchihara, T., & Faez, F. (2021). Efficacy of multimodal glossing on second language vocabulary learning: A meta-analysis. *TESOL Quarterly, 55*(1), 105-133.

Rouet, J. F., & Levonen, J. J. (1996). Studying and learning with hypertext: Empirical studies and their implications. In J. F. Rouet, J. J. Levonen, A. Dillon, & R. J. Spiro (Eds.), *Hypertext and cognition* (pp. 9-23). Lawrence Erlbaum.

Salmeron, L., Kintsch, W., & Canas, J. (2006). Reading strategies and prior knowledge in learning from hypertext. *Memory & Cognition, 34*(5), 1157-1171.

Salmeron, L., & Garcia, V. (2011). Reading skills and children's navigation strategies in hypertext. *Computers in Human Behavior, 27*(3), 1143-1151.

Salmeron, L., Naumann, J., García, V., & Fajardo, I. (2017). Scanning and deep processing of information in hypertext: An eye tracking and cued retrospective think-aloud study. *Journal of Computer Assisted Learning, 33*(3), 222-233.

Schmar-Dobler, E. (2003). Reading on the internet: The link between literacy

and technology. *Journal of Adolescent & Adult Literacy, 47*(1), 80-85.

Shapiro, A., & Niederhauser, D. (2004). Learning from hypertext: Research issues and findings. In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp. 605-620). Lawrence Erlbaum.

Shin, E., Schallert, D., & Savenye, W. (1994). Effects of learner control, advisement, and prior knowledge on young students' learning in a hypertext environment. *Educational Technology Research and Development, 42*(1), 33-46.

Slemmer, D. L. (2002). *The effect of learning styles on student achievement in various hypertext, hypermedia, and technology-enhanced learning environments: A meta-analysis* (UMI No. 3095975) [Doctoral dissertation, Boise State University]. ProQuest Dissertations and Theses Global.

Spiro, R., & Jehng, J. (1990). Cognitive flexibility and hypertext: Theory and technology for the nonlinear and multidimensional traversal of complex subject matter. In D. Nix, & R. Spiro (Eds.), *Cognition, education, and multimedia: Exploring ideas in high technology* (pp. 163-205). Lawrence Erlbaum.

Stauss, A., & Corbin, J. M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques.* Sage.

Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science, 12*, 257-285.

Sweller, J., Ayres, P., & Kalyuga, S. (2011). Measuring cognitive load. In J. Michael, & P. Susan (Eds.) *Cognitive load theory* (pp. 71-85). Springer.

Taki, S. (2016). Metacognitive online reading strategy use: Readers' perceptions in L1 and L2. *Journal of Research in Reading, 39*(4), 409-427.

Unz, D., & Hesse, F. (1999). The use of hypertext for learning. *Journal of Educational Computing Research, 20*(3), 279-295.

Varol, B., & Ercetin, G. (2021). Effects of gloss type, gloss position, and

working memory capacity on second language comprehension in electronic reading. *Computer Assisted Language Learning, 34*(7), 820-844.

Walkowiak, S., Foulsham, T., & Eardley, A. (2015). Individual differences and personality correlates of navigational performance in the virtual route learning task. *Computers in Human Behavior, 45*, 402-410.

Wu, Y., Barquero, L., Pickren, S., Taboada Barber, A., & Cutting, L. (2020). The relationship between cognitive skills and reading comprehension of narrative and expository texts: A longitudinal study from grade 1 to grade 4. *Learning and Individual Differences, 80,* 101848. https://doi.org/10.1016/j.lindif.2020.101848

Yang, J. (2019). New literacy functions and online reading strategy use by successful primary EFL readers for web-based reading. *The Convergent Research Society Among Humanities, Sociology, Science, and Technology, 9*(5), 169-178.

Yeung, A. S. (1999). Cognitive load and learner expertise: Split-attention and redundancy effects in reading comprehension tasks with vocabulary definitions. *Journal of Experimental Education, 67*(3), 197-217.

Yun, J. (2011). The effects of hypertext glosses on L2 vocabulary acquisition: A meta-analysis. *Computer Assisted Language Learning, 24*(1), 39-58.

Zammit, K. (2011). Moves in hypertext: The resource of negotiation as a means to describe the way students navigate a pathway through hypertext. *Linguistics and Education, 22*(2), 168-181.

Zhang, S., & Duke, N. K. (2008). Strategies for Internet reading with different reading purposes: A descriptive study of twelve good internet readers. *Journal of Literacy Research, 40*(1), 128-162.

APPENDICES

APPENDIX 1. Background Information Interview Questions ····· 124

APPENDIX 2. English Texts Used in this Research ····· 126

APPENDIX 3. Orientation Materials ····· 127

APPENDIX 4. Reading Comprehension Questions ····· 130

APPENDIX 5. Semi-structured Interview Questions ····· 131

APPENDIX 6. Final Interview Questions ····· 132

Appendix 1. Background Information Interview Questions

	Section	Content
Section A	영어 학습 배경	·몇 살 때 영어를 처음으로 배웠나요? ·처음 영어를 배울 때부터 지금까지 꾸준히 영어 공부를 해왔나요? ·외국에서 영어 공부를 한 적이 있나요? 있다면 몇 년/ 몇 개월/ 몇 일 정도 공부하였나요? ·평소 영어 공부를 어떤 방법(학원, 학습지 선생님, 학교수업만 참여, 가정에서 스스로 학습 등)으로, 일주일에 몇 번, 몇 시간 정도 공부하나요? ·어떤 자료를 활용하여 영어 공부를 하였나요? (온라인 동화 읽기, 교과서 자료 복습, 학원 문제집 등..)
Section B	영어에 대한 흥미	·영어 공부하는 것을 좋아하는 편인가요? 좋아한다면 그 이유는 무엇인가요? ·영어 공부하는 것을 좋아하지 않는 편이라면 그 이유는 무엇인가요? ·평소 영어 공부를 할 때 어떤 점이 어려웠나요?
	한국어 읽기	·평소 독서를 많이 하는 편인가요? 한글 책은 얼마나 자주 읽나요? ·주로 관심 있게 읽은 한글 책의 내용은 어떤 분야의 글인가요? (소설책, 과학기술과 관련된 글, 위인전, 환경과 관련된 설명문, 사회 이슈를 담고 있는 글, 신문 등..)
Section C	영어 읽기	·영어로 된 글을 자주 읽는 편인가요? 얼마나 자주 읽나요? (일주일에 몇 번/ 몇 시간/ 몇 분 정도 읽나요?) ·나의 영어 읽기 수준은 어느 정도인가요? (교과서 글을 기준으로 생각해봅시다.) 1) 사전의 도움 없이 교과서의 내용을 완벽하게 이해할 수 있다. 2) 사전의 도움이 없이 교과서 내용을 반 이상 이해할 수 있다. 3) 사전의 도움이 없이 교과서 내용을 거의 이해할 수 없지만 단어는 읽을 수 있다.

		4) 사전의 도움이 없이 교과서 내용을 거의 이해할 수 없고 알파벳도 잘 알지 못한다. ·영어로 된 글을 읽을 때 어려운 점이 있다면 무엇인가요? ·영어로 된 글을 읽을 때 어떤 종류의 글을 많이 읽었나요? (예시: 이야기나 동화, 영어로 된 설명문, 주장하는 글 등..)
Section D	전자기기 친밀도 (2)	·평소 전자기기를 얼마나 자주 활용하나요? 어떤 전자기기를 주로 활용하나요? ·전자기기를 활용하여 어떤 기능들을 사용하나요**?** 사용하는 앱과 기능을 한 가지 이상 이야기해주세요.
Section E	온라인 읽기	·온라인으로 영어책이나 영어로 된 글을 읽은 적이 있나요? ·얼마나 자주 온라인으로 영어로 된 글을 읽나요? ·어떤 종류의 전자기기(컴퓨터, 아이패드, 휴대폰, 와콤패드, tv..)를 활용하여 책을 읽나요? ·온라인에서 정보를 찾거나 읽을 때 주로 영상으로 된 정보와 글로 된 정보 중 어떤 것을 사용하나요? ·온라인으로 글을 읽을 때 어려운 점이 있었다면 무엇인가요? ·온라인으로 활용하여 글을 읽을 때 어려운 점은 어떻게 해결했나요? ·온라인 자료를 활용할 때 유튜브, 네이버 백과사전, 네이버 사전을 사용해본 적이 있나요?

Appendix 2. English Texts used in this research

Measuring Time (Session 1)

There are many ways to count time. Time can be counted in minutes and hours. It can be counted in days, months, and years. Read on to see how we measure the passing of time.
There are 24 hours in a day. An hour is 60 minutes. There are seven days in a week. But there are only five days in the school week.
Can you name them?
There are four weeks in every month. Each month of the year has 28 to 31 days. Which month is your birthday in?
There are 12 months in the year. January is the first. December is the last. New Year's Eve is on December 31. It is the last day of the year.
In most years, February has 28 days. But once every four years, February has 29 days. This is called a leap -year.

So Colorful (Session 10)

Fall is a season of change.
As the weather gets colder,acorns, apples, pumpkins, and leaves change color. Take a look.
Acorns turn brown.
Chipmunks gatherand eat acorns. They store them for the winter.
Apples turn red. Apples ripen in the fall.
Ripe apples can also be green, pink, or yellow.
Pumpkins turn orange. Pumpkins grow on vines.
They turn orange when they are ripe.
Leaves turn yellow.
Tree leaves change color in the fall. They can turn yellow, orange, red, or brown.

Appendix 3. Orientation Materials

<온라인에서 정보를 찾을 때 유의사항>

①정보의 출처가 명확한 지 확인하기

자극적인 제목이나, 불분명한 출처의 영상이나 글(다른 사람의 이야기를 듣고 전달하는 출처가 불분명한 글, 소문) 을 활용하지 않고 **공인된 자료(책, 백과사전, 뉴스, 전문적인 기관, 정부 기관의 글이나 영상)**을 선정하여 활용합시다.

②유해 정보 차단하기

나이에 적합하지 않은 글이나 영상 (불건전한 영상, 욕설, 19 세 이상의 성인을 목적으로 한 영상, 선정적인 영상, 혐오감을 주는 영상, 폭력을 조장하는 영상) 은 활용하지 않습니다. 영상에 대한 설명을 미리 확인하여, **유해 정보를 포함하고 있는지 확인**하고 나의 연령에 적합한 영상을 선택해야 합니다.

③내가 찾고자 하는 정보에 **알맞은 도구**를 활용하여 정보를 검색하기

(네이버 영어사전, 백과사전, Youtube 영상자료: 주요 기능은 다음 장 참고)

<하이퍼 텍스트(온라인 도움 자료) 활용 방법>

◎ **선생님의 시연 후** 여러분의 하이퍼텍스트 자료 활용 **연습 시간**이 있습니다.

• 여러분은 제시되는 화면 속에 **굵게 표시된 영어 단어**를 클릭하여 **영어사전**을 활용하거나, 영어 지문 옆에 **파란색 글씨로 표시된 제목의** 자료 (백과사전, 유튜브)를 활용할 수 있습니다. 선생님이 미리 제공해주는 자료외에도 추가적으로 여러분이 모르는 내용을 자유롭게 검색해 볼 수 있습니다.

◎ **하이퍼텍스트 자료**의 주요 기능을 익혀봅시다.

1. 네이버 사전

URL: endic.naver.com

- 한영 / 영한 / 국어 사전 Korean-English /English-Korean/ Korean-Korean dictionary
- 단어 / 어구/ 문장 단위 검색 Searching a single word /phrase /sentence
- 단어 / 어구/ 문장 단위 발음듣기 Listen to pronunciation of a word/phrase/ sentence
- 검색창 자동완성 기능 Predictive in the search box
- 번역 기능 Translator (Papago)
- 연관검색어 Related searches
- 링크를 클릭해 다른 항목으로 이동 Hypertext: linked pages to other entry

2. 네이버 백과사전

URL: terms.naver.com

- 일반 백과/어린이백과/학생백과(청소년백과): 자신의 이해 정도에 따라 선택 가능 General Encyclopedia/Kids' encyclopedia/ Students' encyclopedia
- 단어/어구/문장 단위 검색 Searching a single word / phrase / sentence

• 검색창 자동완성 기능 Predictive in the search box

• 연관검색어 Related searches

• 링크를 클릭해 다른 항목으로 이동 Hypertext: linked pages to other entry

3. Youtube (유튜브)

URL: www.youtube.com

• 검색연산자 및 고급검색 Search operator and Advanced search

1) 검색창에 검색어를 입력한 후 확인 누르기

2) 아래에 필터를 클릭하여 나의 필요에 따라 **"영상이 올라온 기간, 길이, 화질, 정렬기준"** 등에 알맞게 검색을 설정할 수 있다.

• 검색창 자동완성 Predictive in the search box

• 관련검색 A list of searches related to keyword

• 영상 속도 조절 Youtube playback Speed control

Appendix 4. Reading Comprehension Questions

Reading Comprehension Questions (Session 1)

1. 위 글의 주제는 무엇입니까?
2. 위 글에서 2월(February)은 어떤 특징을 가지고 있다고 했나요?
3. 위 글에서 주(week), 시간(hour), 분(minute) 과의 관계는 무엇이라고 이야기 했나요?
4. 당신의 생일은 언제이며, 지금으로 부터 당신의 생일까지는 몇 주 정도 남았나요?

Reading Comprehension Questions (Session 10)

1. 위 글의 주제는 무엇인가요?
2. 위 글에서 가을에 잎사귀들과 사과는 각각 어떻게 변한다고 했나요?
3. 가을에 호박은 어떻게 변하는지 그 특징을 두 가지 이상 써볼까요?
4. 호박은 식물의 어떤 부분에서 자란다고 했나요?

Appendix 5. Semi-structured Interview Questions

Time	Section	Content
After each task	내용 이해 (주제 흥미도, 배경지식 등)	·글의 전체적인 내용을 이해할 수 있었나요? ·글의 내용 중에서 이해하기에 어려운 부분이 있었다면 어떤 부분이었나요? (글을 보면서 말하기) ·글을 이해하기 어려웠던 이유는 무엇이었나요?
		·글의 내용이 재미있었나요? ·글의 내용이 평소 내가 잘 알고 있고 경험했던 분야인가요? ·글에서 제시된 내용 중 내가 이미 알고 있던 내용은 무엇이었나요?
	Hypertext materials 사용	·글을 읽을 때 발생한 어려움을 해결하기 위해 어떤 자료들을 활용했나요? ·글을 읽을 때 도움자료(하이퍼텍스트)를 활용하는 나만의 방식(전략)이 있다면 무엇인가요? ·글을 읽을 때 주어진 도움 자료 이외에 추가적으로 검색을 했다면 무엇 때문에 검색을 했나요?

Appendix 6. Final Interview Questions

Time	Section	Content
After whole main session	Hypertext materials 사용	·글을 읽을 때, 지금까지 사용했던 도움 자료(하이퍼텍스트 자료)들 중 어떤 종류의 자료가 도움이 되었으며 그 이유는 무엇인가요? ·글을 읽을 때 도움이 되지 않은 자료(하이퍼텍스트 자료)는 어떤 종류였으며 그 이유는 무엇인가요?
	읽기 인식	·도움자료(하이퍼텍스트)를 사용하기 전과 후에 읽기에 대한 생각이나 느낌이 어떻게 달라졌나요?
	영어 학습	·도움자료(하이퍼텍스트)를 사용하고 나서 영어 공부하는 것에 흥미가 생겼나요? ·도움자료(하이퍼텍스트)를 사용하고 나서 영어에 자신감이 생겼나요? 도움자료(하이퍼텍스트)를 사용하여 읽기를 하고 나서 스스로 집에 가서 활용해본 적이 있나요?(네이버 사전, 네이버 백과사전, 유튜브 등)

국 문 초 록

21세기 정보화 사회에서 지식 정보 처리 능력의 중요성은 나날이 증가하고 있다. 2015 개정 영어 교육과정에서는 지식 정보 처리 역량을 새로운 중심 역량으로 소개하고 있으며, 최근 코로나 바이러스로 인한 비대면적 영어 학습 환경이 확대됨에 따라 다양한 온라인 영어 저작물이 개발되어 제공되어왔다. 온라인 저작물은 사전, 영상자료, 백과사전 등의 다양한 자료와 링크로 연결되어 학습자의 필요에 따라 즉각적으로 선택 및 활용이 가능한 하이퍼텍스트(hypertext)기술이 적용되어 구현되었다. 이에 개별 학습자의 올바른 자료 판단 및 활용 역량에 따른 영어 학습 능력의 차이가 심화되고 있는 현실이다.

그러나 영어 읽기에 관한 여러 선행 연구들에서 온라인 하이퍼텍스트 자료의 활용은 성인 학습자를 비롯하여 영어 학습 능력이 우수한 학습자에게만 제한적으로 이루어졌다는 한계를 보이고 있다. 따라서, 본 연구는 연구 대상의 범위를 확장하여 EFL 환경의 초등영어 학습자들이 영어 읽기 활동에서 온라인 하이퍼링크 자료를 어떻게 사용하고 인식하는지 인지적, 정의적 관점에서 질적으로 고찰해보고자 한다.

이를 위해 한국의 초등학교 6학년 학생들이 자발적으로 참여하였으며 스크린 테스트를 거쳐 세 명의 참가자들이 모집되었다. 연구 참여자들은 총 16회의 온라인 영어 읽기 과업을 수행하며 세 개의 온라인 자료(네이버 영어 사전, 네이버 백과사전, 유투브)를 활용하였다. 참여자들은 개인적인 필요에 따라 자료를 활용하며 읽기 중 발생한 어려움을 해결하였고, 효과적인 독해를 위한 전략들을 사용하였다. 읽기 과업 직후에는 학습자들의 온라인 하이퍼링크 자료의 활용 목적과 읽기 과정 전반에 관한 면담이 실시되었다. 온라인 영어 읽기 과업은 줌(ZOOM) 프로그램을 통해 화면 녹화 및 음성 녹음되었으며, 면담 내용은 스마트 폰을 이용하

여 녹음되었다.

세 명의 학습자들은 영어 수준 및 배경지식, 이해도 측면에서 차이를 보였으며 영어 학습 수준과 필요에 따라 적합한 정보 활용 전략 및 읽기 전략을 발전시켜가는 모습을 보였다. 특히, 학습자들이 온라인 하이퍼링크 자료를 활용하며 읽기의 어려움을 해결하는 과정에서 언어적 지식의 습득, 배경지식의 축적 등의 인지적 변화와 더불어 학습자 개인의 영어 읽기에 대한 흥미(reading interest)와 자신감(self-confidence), 자기 효능감(self-efficacy)를 느끼는 등의 정의적인 변화를 관찰할 수 있었다. 비록, 참여자의 영어 학습 수준에 따라 전략을 사용하는 양상에 있어서는 차이가 있었으나 온라인 하이퍼링크 자료가 초등 영어 학습자의 제 2언어 학습에 미치는 긍정적인 영향을 파악할 수 있었다.

본 연구는 방법론적 측면에서 일부 한계가 있었으나 초등 영어학습자들이 영어 읽기 활동에서 정보를 주체적으로 활용하며 효과적인 문제해결에 기여하는 적극적인 읽기를 실천하였다는 점에서 온라인 영어 학습 및 영어 읽기 활동에서 활용할 수 있는 온라인 하이퍼링크 자료의 영향력에 대해 통찰을 제시하고 있다. 이에 영어 교육환경에서 하이퍼텍스트 기술과 온라인 정보 매체의 접목을 통해 학생들의 읽기 흥미를 증진시키는 데 도움이 될 수 있을 것으로 기대한다.

주요어: 하이퍼텍스트, 하이퍼링크, 온라인 자료, 외국어 읽기 학습, 자아효능감, 온라인 읽기 전략, 정보 활용 전략

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